VOLUME 28 APRIL 1935 NUMBER 4

Southern Medical Journal

Journal of the Southern Medical Association

Published monthly by the Southern Medical Association, Empire Building, Birmingham, Ala. Annual subscription $4.00. Entered as Second-Class Matter at the Post Office at Birmingham, Ala., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of Oct. 3, 1917, authorized Dec. 20, 1921.

Southern Medical Association, Twenty-Ninth Annual Meeting, St. Louis, Missouri, November 19-22

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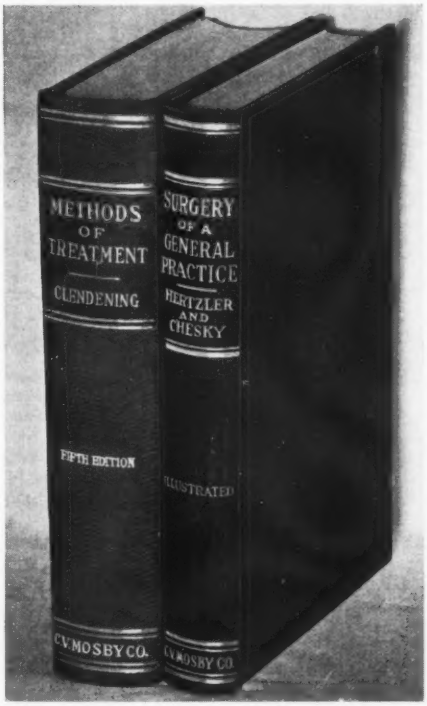

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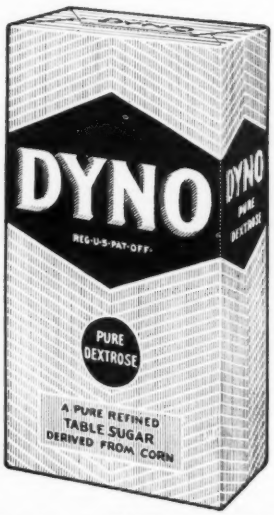

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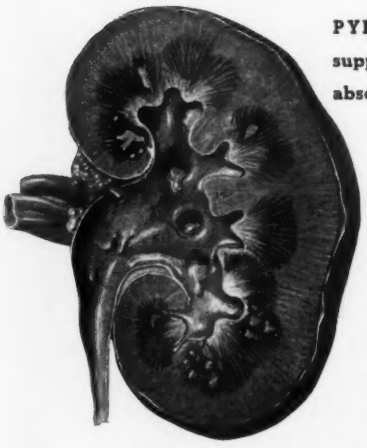

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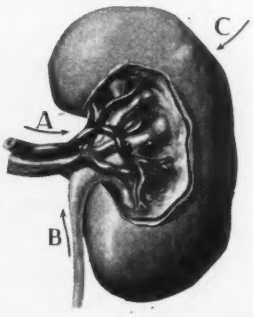

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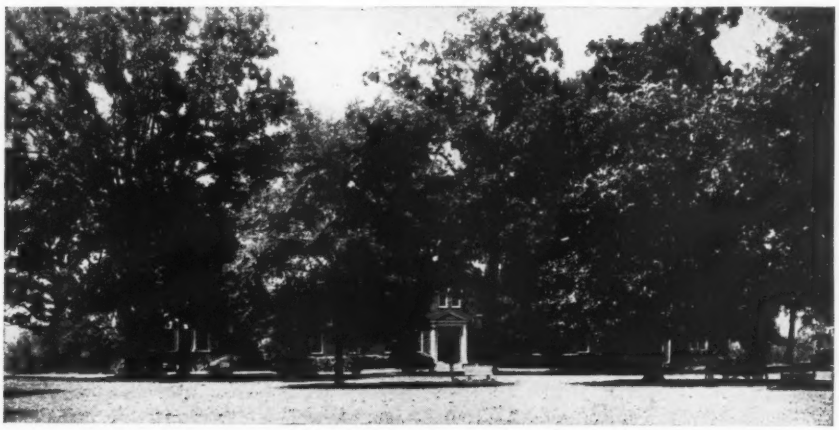

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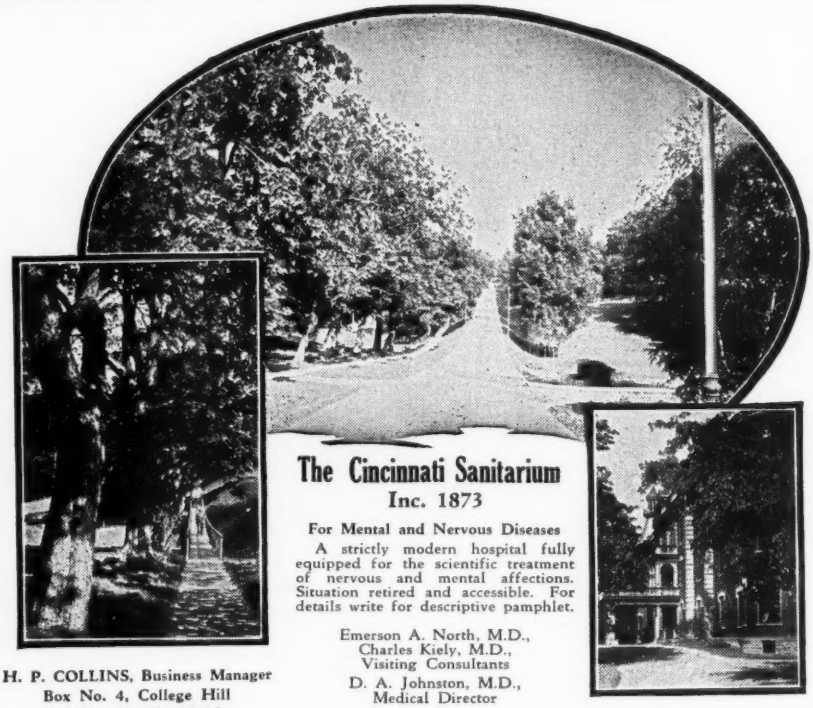

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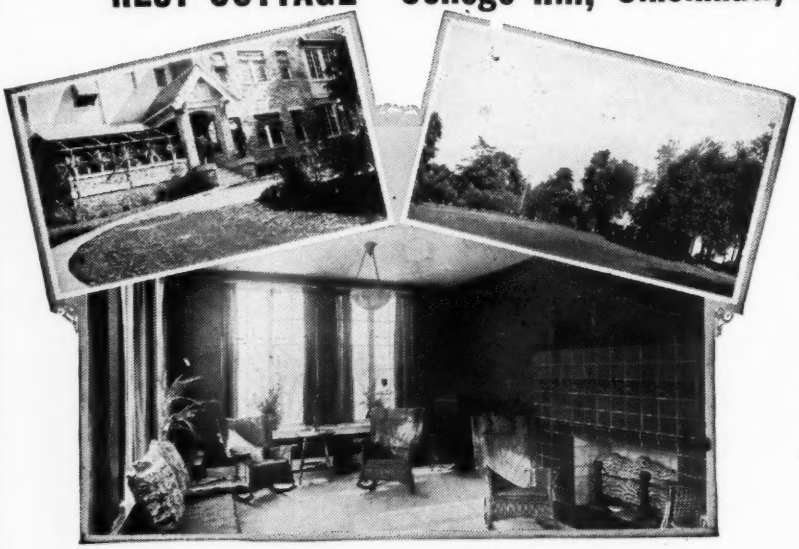

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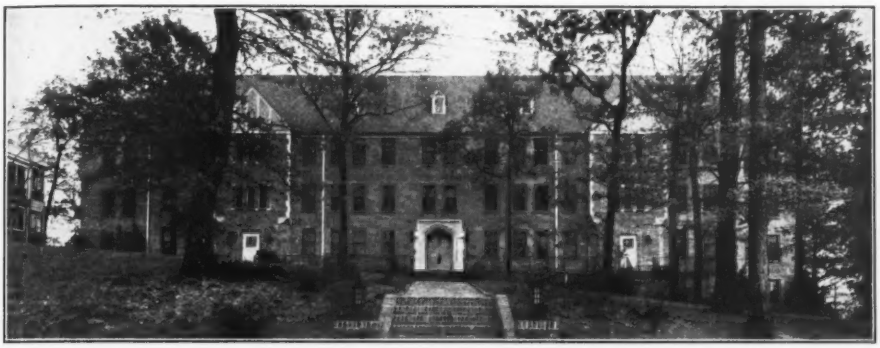

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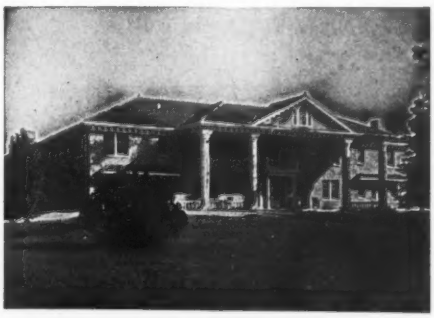

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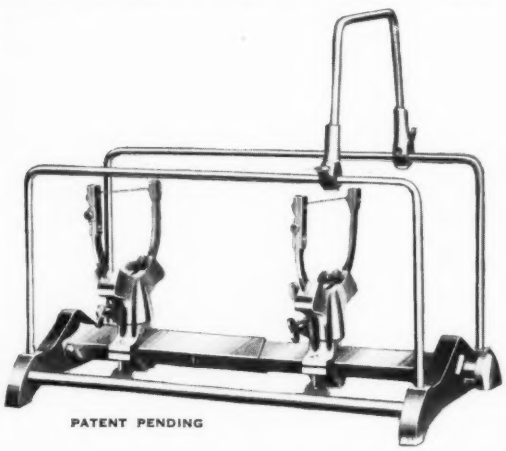

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Volume 28 APRIL 1935 Number 4

THE RELIEF OF PAINS OF THE LOCOMOTOR SYSTEM BY LOCAL INJECTIONS OF IODIZED OIL*

WITH CONTROL BY X-RAYS

By JACQUES FORESTIER, M.D.,F.A.C.R.,(Hon.),†
Paris and Aix-les-Bains,
France

Since the underlying causes of many forms of chronic arthritis and neuritis remain unknown, or cannot be always controlled successfully, the palliative treatment of these conditions seems reasonable. Most important of all is the relief of chronic pain which causes secondary disturbances: local (muscular contracture) and general (sleeplessness, loss of appetite, and so on).

In 1920, when attempting to explore roentgenologically the epidural space with iodized oil injections, J. Sicard and I noted that some patients suffering from chronic lumbar pains found themselves remarkably relieved by these exploratory injections. At the request of the patients the injections were repeated with excellent results.

In the years following the method of local injections was extended to the treatment of certain forms of neuritis and osteo-arthritis, of different bony pains and a technic was elaborated.

The favorable results of this method were published by Sicard and me and our coworkers in various articles and confirmed by a number of authors in France and abroad. Our experience was summed up in our book.[2]

Basis of the Method.—Leriche and Policard have shown that in chronic arthritis the source of the pain is not located in the intra-articular structures, that is, the cartilages, which do not receive any nervous distribution, but in the periosteum, in the insertions of the capsule, of the periarticular ligaments and of the tendons of the periarticular muscles.

The practical applications of these premises lies in the periarticular injections of local anesthetics by Leriche alone,[4] and with his coworkers[5] and Courboules and others[6] who have proven the value of this method in relieving the pains and subsequent muscular spasm in joint sprains and in traumatic arthritis.

As the epidermal injections of iodized oil (lipiodol) gave a remarkably prolonged analgesic effect in chronic lumbar pains, it appeared justifiable to attempt periarticular injections of this oily compound in chronic arthritis on the basis that its slow absorption would bring about a benefit of much longer duration.

We will describe hereafter the indications, technic and results of the following routes devised by Sicard and myself, which have proven beneficial after an experience of over twelve years.

(a) Perinervous injections, either in the nerve trunk and its branches or in the plexus and nerve roots in their extramedullary portion.

(b) Periarticular injections, around the capsule, the attachment of the ligaments, and the tendons of the adjoining muscles.

(c) Intra-articular injections, the indications of which are much more limited.

General Precautions.—Several principles must be kept in mind in the use of local lipiodol injections for therapeutic purposes.

(1) A careful diagnosis must be made and visceral disease must have been ruled out as a cause of the peripheric pains. (In spite of this, Legrand, of Rouen, has reported good palliative results in perivertebral injections in metastasis of cancer.)

(2) They are to be used in protracted and resistant cases when etiologic treatment has failed

*Read in General Clinical Session, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

†Physician to the Hospice Thermal Reiner Hortense, Aix-les-Bains.

or is impossible, and when physiotherapy is not sufficient to bring about important relief.

(3) One or several x-ray films of the part to be injected must be made previous to the injection, as the opacity of the substance and its slow absorption may disturb such an examination for some time.

(4) For the same reason one must inject exactly the minimum effective quantity and not more.

Instruments.—No special instruments are required, but the high viscosity of the oil and the necessity of long needles when deep injections are to be made leads to the use of relatively small syringes with a long barrel or with a screw piston; both types permit one to use a high pressure for the injection. Syringes of 2 c. c. capacity and needles of a diameter of 0.0012 centimeter and of the appropriate length are, as a rule, satisfactory. The oil should be heated to body temperature to make it more fluid.

Technic.—The injections should be made "loco dolenti." A careful examination of the part to be injected is necessary; by careful palpation the sore points should be detected and marked with a dye. In these points only are the local injections effective. For this reason, all the points of injection described hereafter are only approximate; when no sore points are detected by palpation, injections prove to be useless. Needless to say, all dangerous areas with blood vessels and underlying viscera should be avoided.

When treating a wide area we prick the needle in the center of the area and then inject a small quantity of oil in several successive directions fanwise by partially pulling out the needle and then pushing it in in another direction. Thus one prick may equal three or four ordinary injections. No special preparation of the patient is to be made: the technic is perfectly ambulatory and patients are asked to move their limbs immediately after the injection. Local rubbing or gentle massage may ease the spreading of the oil. A dull pain is resented during 24 to 48 hours at the site of the injection and disappears; the relief may be obtained within four or six days, but sometimes appears later on, after repeated injections. A temporary and moderate rise in temperature to 100° may be exceptionally observed, but never lasts long.

I. INJECTIONS AROUND THE NERVES

These are indicated mostly in so-called cases of chronic neuritis, when the causative treatment cannot be found, or when the etiological treatment has failed. Sciatica, intercostal, cervicobrachial, suboccipital neuralgias and chronic lumbago are among the most common indications.

These injections can be made:

(a) Into the nerve trunks.

(b) Into the branches of the plexus

(c) Into the roots of the plexus (funiculus) by the epidural route.

In a given case of neuritis any of these different technics may be associated.

Nerve Trunks, Sciatica.—This is the most common of neuralgias. It is more a disease of a region than of a nerve; therefore we often associate in its treatment peritrunkal, sacro-iliac and epidural injections. When we deal with a "low" sciatica, with manifest symptoms on the nerve trunk and its branches, a certain number of injections are made on the tender spots detected by palpation along the external or internal popliteal nerves on the leg and along the main trunk and the back part of the thigh. A four-inch needle is thrust directly near the nerve and 1 or 2 c. c. are injected in each point. Two or three injections of iodized oil may be made at a time. Five to ten injections may be necessary to bring about complete relief (*Fig. 1*).

In dealing with a "middle" sciatica, if the focus of pain irradiates from the buttock, the same injections are directed in the nerve trunk where it emerges from the greater sciatica foramen, using a six-inch needle (*Fig. 1*). The control of the proper position of the needle is given by the irradiated pain which the patient presents in the toes when the needle touches the nerve fibers. Two or 3 c. c. of iodized oil are then injected. Occasionally one or two deep injections for the branches disseminated into the gluteal muscles must be given in addition. When signs of "high" sciatica in the sphere of sacro-iliac joint and lumbar spine are observed, combined sacro-iliac and epidural injections may be indicated. We have performed similar peritrunkal injections in the obdurator, intercostal median, ulnar nerves, and so on. In each case we aim to inject the trunk at an appropriate level when it can be reached without danger. In suboccipital neuralgia, the injection can be performed at one inch and a half from the median line against the occipital bone.

Trigeminal neuralgia, or "tic douloureux," which belongs to an entirely different type of

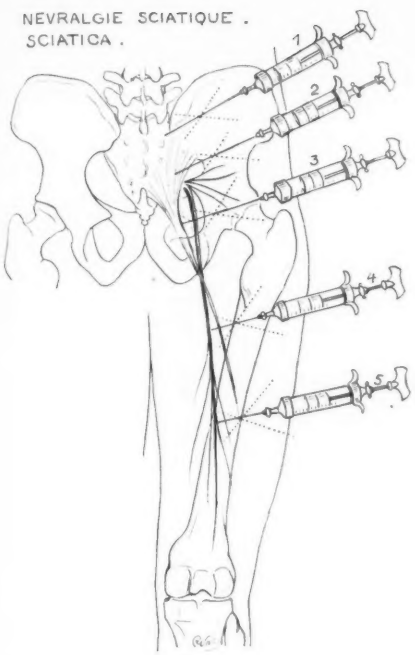

Fig. 1

Injections into the trunk of the sciatic nerve in a case of sciatica. The sketch shows the levels where the injections are generally performed and the direction of the needle. Note the dotted lines, showing the different positions of the needle for each injection, with the purpose of spreading the oil over a wider surface. Not more than two injections are made the same day.

neuralgia, is not amenable to lipiodol injections, but responds to alcohol injections.

Branches of Plexus.—They can be easily approached in the cervical region for the treatment of cervicobrachial neuralgia. The needle is inserted at a distance of 2 to 3 inches from the spinous processes and pushed directly through the fibers of the trapezius and of the deep muscles of the neck to a depth of 4 to 6 inches. Generally it is necessary to inject 2 or 3 branches of the plexus to obtain notable relief.

Intervertebral Foramina.—Such injections can be made either alone or as a complementary measure for any so-called "rheumatic" or "idiopathic" neuralgia at any level of the spine, but they are more frequently indicated in the lumbar and dorsal region.

Before giving such an injection it is essential to determine, by clinical examination, sometimes helped by x-rays, which of the roots of the plexus (funiculus) are the cause of the referred pains: crural, genitofemoral, ilioinguinal, intercostal nerves.[7] Once the level has been determined, it is safer to inject the supposed responsible funiculus and also the two adjoining ones, above and below. The needle is implanted on the horizontal line passing over the corresponding spinous process at a distance of two inches and pushed normally to the surface: at a depth of 2 to 3 inches, depending upon the thickness of the perivertebral muscles it strikes against the transverse process. It slides over its upper edge and then can be pushed farther without any obstacle; generally a sharp irradiated pain shows that the funiculus has been reached. If it is not felt, the needle should not be pushed more than one inch farther than the transverse process. In the dorsal region there is a danger of perforating the pleura. Two c. c. of lipiodol are sufficient for one funiculus.

Epidural Injection.—This has been applied chiefly to the treatment of "high" sciatica or lumbosciatica neuralgia when the origin of the peripheral signs seems connected with a mild form of arthritis in the lumbar spine, with irritations of the "funiculi" in the intervertebral foramina, or also in case when the pains in the lower limbs are associated with contracture, tenderness at pressure on the erector spinae and on the gluteal muscles. Cases with so-called "sciatica scoliosis" (lateral inflexion) and lumbar cyphosis respond remarkably well to epidural injections.

We have used sometimes the "high" epidural route by proceeding just as for a dorsal or lumbar puncture and stopping the needle immediately after the ligamentum flavum has been perforated.[8] But the sacrococcygeal route, which was discovered long ago by Sicard and Cathelin, is easier and familiar to surgeons, gynecologists and genito-urinary specialists. We shall not describe it in detail.

The patient is put in the knee-chest position. Local anesthesia is performed. A thick needle of 0.0012 centimeters is implanted in the coccygeal canal and from 4 to 6 c. c. of warmed lipiodol are injected slowly.

If the patient has bilateral pains he will remain in the same position for ten minutes and then will lie on his back for two hours in Trendelenburg's position, at 40 degrees with the horizontal, knees bent to suppress the lumbar lordosis. At the end of this time the lipiodol has become anchored in the midst of the epidural fat and no postural change of the patient will displace it.

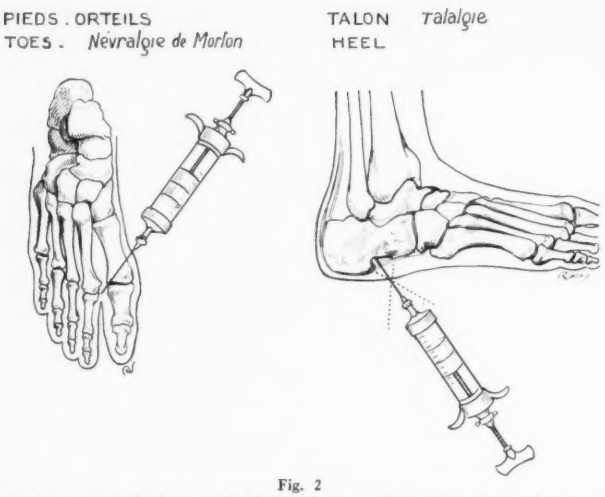

Fig. 2

Injections around the bones. (Left) Injection near the metatarsal bone in a case of Morton's metatarsalgia. (Right) Injection near the plantar surface of the calcaneus in a case of chronic talalgia.

If the patient is suffering from unilateral sciatica, after ten minutes' knee-chest position he will be directed to lie on the affected side for an hour or two.

Moderate reactions of pain and temperature are experienced after epidural injections. These may be repeated at one week's interval two or three times, each injection adding a new "wave" around the nerves. X-ray examinations prove the remarkable power of progression of lipiodol, which slides along the sacral roots at a distance of 10 to 15 inches from the canal. The remarkable analgesic effects of long duration brought about in prolonged cases of neuritis by lipiodol injections around the nerves have been confirmed by Coste,[9] Leri,[10] Decourt[11] and Haguenau.[12]

II. INJECTIONS AROUND BONES AND JOINTS

These are recommended whenever the source of the pain lies in the periosteum. Such conditions are often associated with hypertrophic changes and belong to chronic arthritis or post-traumatic cases. Atrophic (rheumatoid) arthritis being more a systemic disease, with multiple joint involvement, is best treated by injection of gold salts, a method which I presented in 1929.[13]

Injections Into the Foot.—These are used for chronic talalgia, Morton's metatarsalgia and painful forms of hallux valgus. For talalgia, the needle is thrust either from the plantar aspect of the foot, or from the inner or outer side, and directed toward the sore spot, or toward the plantar spur when this is detected by x-ray. The needle of four inches length goes through the plantar ligaments, under local anesthesia, deep against the plantar surface of the calcaneus on the anterior part of the tuberosity (*Fig. 2*). Two c. c. are injected, changing the direction of the needle two or three times. Within a day the heel swells and is painful. Walking can be resumed after four or five days. In 8 cases out of 10 talalgia disappears completely. Injections can be repeated. In Morton's metatarsalgia it is essential that the algogenic area, whence the pain radiates, should be very precisely determined by careful palpation. It is generally located on one side (lateral) of the head of a metatarsal bone, close to the metatarsophalangeal joint. A short needle (2 inches) is thrust into the intermetatarsal space. Local anesthesia is performed (*Fig. 2*) as the needle tends to reach the focus of the pain. Such contact is generally excruciating. It is only after a few minutes, when anesthesia is completed, that 1 c. c. of lipiodol is injected against the bone. After two days' reaction relief begins to appear. Very few failures are experienced if proper technic is carried out.

Hallux valgus is to be injected only when very painful. The injection should be made against the distended lateral ligaments in their attachments on the head of the metatarsal bone.

Injections Around the Knee.—These are most frequently employed, since degenerative arthritis in old women is most common, and periarticular lipiodol injections are a great help in resistant cases. Treating a knee by this method requires two or three periods, since 4 to 6 injections are generally required. The selected points of injection are: around the femur, on the inner aspect of the medial condyle and the outer aspect of the lateral condyle; around the tibia in front of the superior tibiofibular joint and on the medial aspect of the medial condyle. In each case the needle should touch the periosteum before the injection is made (*Fig. 3*).

Additional injections can be made under the patellar ligament and also behind the joint,

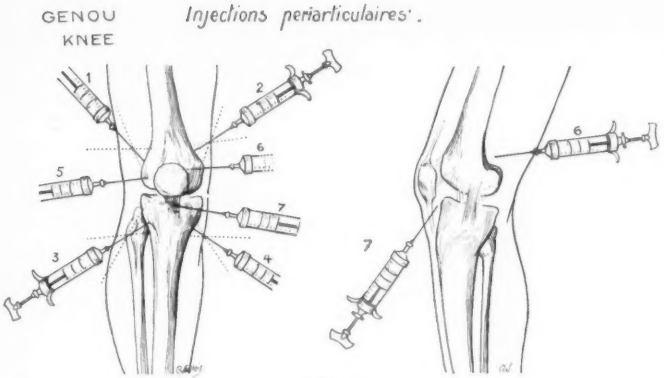

Fig. 3

Injections around the knee joint in a case of chronic hypertrophic arthritis. Nos. 1, 2, 3, 4 and 5 are made around the capsule of the joint. No. 6 is made in the popliteal fossa near the cruciate ligaments. No. 7 is made under the patellar ligament.

close to the cruciate ligaments in the popliteal fossa. Care should be taken that in no instance the capsule be perforated and the injection made into the synovial cavity. Such a mistake would surely cause unpleasant effusion of one or two weeks' duration.

Very moderate discomfort results from periarticular injections around the knee joint. Patients are able to walk; improvement takes place progressively within a week or two and persists during six months to a year. These results have been confirmed by Schulmann and Benassy[14] and also by Weissenbach and Gilbert-Dreyfus.[15]

Periarticular injections in case of hip joint arthritis have not been as successful. Great difficulty is experienced in reaching the sore joints and the importance of static disturbances in this disease diminishes the chances of success.

Injections Around the Sacro-Iliac Joint.—Injections of lipiodol around the sacro-iliac joint give such brilliant results in the so-called "rheumatic" sciatica in post-traumatic strain that we consider them worthy of special notice. The posterior spina of the ilium is located with one finger; this is an easy matter even in obese subjects. Then, at a point lying in the immediate vicinity of this spine, but towards the median line of the body, a needle is thrust in perpendicularly (length of needle, 4 inches). When the point of the needle has penetrated to a depth of about 2 or 3 inches it will collide with a bony surface. Into the hiatus thus reached from 2 to 3 c. c. of lipiodol are injected. One should take care to jab the needle in different directions so that the whole cavity will be copiously and uniformly bathed in oil (*Fig. 4*).

Injections Around the Shoulder and the Elbow.—They are not performed so frequently, since degenerative changes do not occur very often in these joints. But we have used them for post-traumatic (tennis elbow) cases with persistent joint pains. The principles of injection are the same as for other joints: painful points should be determined and injections performed close to the periosteum, in the attachments of the ligaments and tendons.

Other Forms of Injections Around Bones.—Injections against the vertebral laminae may be done in chronic muscular lumbar pains: the oil spreads along the fibers of the erector spinae muscles.

Injections in Amputation Stumps.—In ten cases of agonizing pains in amputation stumps in war veterans we obtained a remarkable relief by local injections of lipiodol. These were performed under careful local anesthesia and repeated up to a high dosage, 40 to 50 c. c. in all, which made a protective coating around the irritable neurosis.

III. INJECTIONS INTO THE JOINTS AND INTO SYNOVIAL SHEATHS

Such injections are quite exceptional and we have discarded them in degenerative cases of ar-

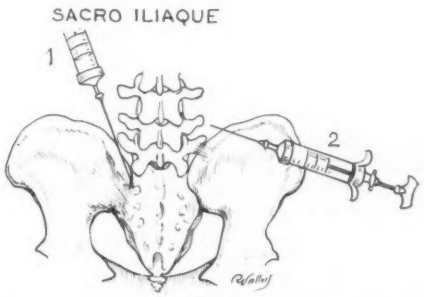

Fig. 4

Injections around the sacro-iliac joint in a case of sacro-iliac strain. No. 1 is made in the sacro-iliac hiatus. No. 2 close to the transverse process of the fifth lumbar. Injection demonstrated on the opposite side for the purpose of making the picture clearer.

thritis. Conversely, they may be of some help in the inflammatory forms of arthritis and Charcot's tabetic joints.

It must not be forgotten that, except in tabetic joints, only a small dose of 0.5 c. c. of lipiodol is to be used for the first injection into a joint cavity. This is sufficient to bring about a fair amount of local reaction, pain and fluid effusion, and of general reaction, temperature. For the succeeding injections the dose can be increased to 1 or 2 c. c. We discard entirely the technic of injections of high doses (10 to 40 c. c.) described by Sievers[16] and by Kreuscher and Kelikian.[17]

Injections Into the Knee Joint.—We treat by this method only Charcot's tabetic joints and recurrent hydrarthrosis.

In the first case the joint is tapped, the fluid aspirated and 2 c. c. of lipiodol are injected. The reaction is generally moderate and within five to seven days the procedure is repeated, increasing the dose of lipiodol to 5 or 10 c. c. It will take a month or so to replace the fluid effusion by lipiodol. Further dislocation of the joint may be thus prevented.

In recurrent hydrops of the knee our results have been very favorable. We do not know the cause of this curious disease, though one feels that it is dependent upon an allergic factor. It might be expected that disturbing the usual physiology of the synovial lining may be a help against the spells of hydrops.

We inject 0.5 c. c. the first time. If, after two weeks, the effusion is still persistent, a second injection of 1 c. c. is made after withdrawal of the fluid. In most cases this is sufficient to stop further effusion. Lipiodol will be absorbed almost entirely by the synovial lining within eight to ten months.

Injections Into Synovial Sheaths of the Wrist.—We use them mostly for tendinous synovitis. Puncture of the tendon sheath usually allows extraction of 1 to 2 c. c. of a thick, viscid, ropy, and at that time grumous fluid. The treatment consists in extracting the fluid and replacing it by 0.5 to 1 c. c. (or even more) of lipiodol. Successive aspirations of fluid and injections of oil will bring about a cure.

General Results and Accidents.—After an experience of twelve years, with several thousands of injections of iodized oil made into the various parts of the body for diagnosis and therapeutic purposes, we can claim that this method is not dangerous. Very rarely have patients shown any sign of general iodism. In two cases injections had to be discontinued because they caused a very marked local inflammatory reaction. In no case has there been an abscess. We have had only two accidents: one injection into the pleura when trying to inject an intercostal nerve near the intervertebral foramen, and one intra-articular injection into a degenerative knee when periarticular injection was meant. In both cases a temporary effusion took place, but no after effects were noticed.

The beneficial results of the local injection do not appear at once. A reaction appears within 24 hours: it consists of increased pain, swelling, and sometimes redness of the site of injection. The intensity depends upon the sensitiveness of the patient, the point of injection and the amount of oil injected; it never lasts more than one or a few days. It corresponds very probably to a leukocytic afflux brought about by the oil. When this has disappeared improvement begins slowly and is obvious within one or two weeks. The reduction of pain diminishes the muscular spasm and thus improvement appears in the function of the limbs. The sore points where injections have been performed become painless to palpation. Such an improvement, which occurs to a smaller or greater extent in 80 per cent of the cases altogether, will last from six months to a year. If necessary, injections may be resumed, provided it is proven by radiological control that the greatest part of the oil previously injected has been eliminated. Sometimes the disease has worn out before the action of the injection has disappeared, and no further injections are necessary.

INTERPRETATION OF RESULTS

It is not possible to explain with certainty the reasons for the action of local lipiodol injections. But the following factors appear to play a role:

(1) Mechanical relief of the pressure and irritation exerted on the terminal branches of

sensitive nerves around joints, ligaments, which become bathed in oil for some time.

(2) Local leukocytosis, which is brought about by the oily compound; and, perhaps, a change of the local pH of the affected tissues.

(3) Slow absorption without any foreign body reaction explains the prolonged action.

(4) Chemical action from iodine may also be expected; we know the general therapeutic effect of intramuscular injections of lipiodol in chronic degenerative arthritis, in asthma, exophthalmic goiter, arterial sclerosis, and so on; and, generally speaking, the antisclerosing action of iodine. Possibly such action may be also local.

BIBLIOGRAPHY

1. Sicard, J. A.: and Forestier, J.: L'huile iodee en clinique Applications therapeutiques et diagnostiques. Bull. et Mein. Soc. Medic. Hop. de Paris, **47**:309, 1923.
2. Sicard, J. A.; and Forestier, J.: The Use of Lipiodol in Diagnosis and Treatment. Oxford University Press, London, 1932.
3. Leriche, H.; and Policard, A.: Les Problemes de la physiologic normale et pathologique de l'os. Masson, Paris, 1926.
4. Leriche, H.: Des effets de l'anesthesia a la novocaine des ligaments et des insertions tendineuses periarticulaires dans certaines maladies articulaires et dans les vices de position des articulations. Gazette Med. des Hop., **73**:1294, Sept. 10, 1930.
5. Leriche H.; and Fontaine, R.: De la valeur therapeutique des infiltrations periarticulaires a la novocaine dans les entorses et arthrites traumatiques. Presse Medicale, No. 15, p. 280, Feb. 20, 1932.
6. Courboules, Mandillon et Georget: Les injections de novocaine peri et intraticulaires dans l'arthrite traumatique. Gaz-Hebdom-des Sc. Med. de Bordeaux, No. 8, Feb. 25, 1934.
7. Filderman, M. L.: Etiologie et traitement des nevralgies rachidiennes. Bul. et Mem. Soc. de Medecine de Paris, No. 15, p. 574, Nov. 10, 1933.
8. Waldrop, C. P.: La injeccion epidural alta le aceites iodados en el tratamiento de las Algias radiculares. Prensa Medica Argentina, April 12, 1933.
9. Coste, F.: A propos du traitement des Algies et des rhumatismas par la methode des injections locales. Bul. et Mem. Soc. Med. des Hop., Paris, No. 3, p. 103, Feb. 2, 1931.
10. Leri, A.: Sur les injections epidurales de lipiodol. Revue Neurologique, No. 3, p. 363, March, 1926.
11. Decourt, J.: Les injections epidurales de lipiodol dans les sciatiques funiculaires rhumatismales. Paris medical, No. 48, p. 455, Dec. 2, 1933.
12. Haguenau, J.: Le Traitement de la Sciatique. Presse Medicale, No. 83, p. 1633, Oct. 17, 1934.
13. Forestier, J.: Rheumatoid Arthritis and Its Treatment by Gold Salts. Lancet, p. 441, Feb. 27, 1932, and p. 646, Sept. 22, 1934.
14. Schulmann, H.; and Benassy, J.: Traitment des Rhumatismes par les injections anesthesiantes periarticulaires. Bul. & Mem. Soc. Med. des Hop. de Paris, No. 14, May 8, 1933.
15. Weissenbach, R. J.; and Gilbert Dreyfus: Arthrites chroniques, traitement par les injections anesthesiantes periarticulaires. Courrier medical. No. 9, March, 1934.
16. Sievers, R.: Roentgenographie der Gelenke mit Iodipin Fortsch a; d; Geb. b. Roentgenstr. T. XXXV, No. 1, p. 16, Jan., 1926.
17. Kreuscher, P. H.; and Kelikian, H.: The Use of Iodized Oil in the Diagnosis of Joint Lesions. Surg., Gyn. & Obst., **55**:188, May, 1930.

FRACTURES OF THE SPINE*

REPORT OF 301 CASES WITH SPECIAL REFERENCE TO TREATMENT AND END RESULTS

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Injuries of the spine with, or without cord injury, are no longer a clinical rarity. I have treated 301 cases of spine injuries at the Coal Valley Hospital, Montgomery, West Virginia, since 1927. They have been divided as follows:

(1) Fractures of the dorso-lumbar area	204 cases
(2) Fractures of the transverse processes	79 cases
(3) Fractures of the cervical spine	18 cases
(4) Associated cord lesions of varying degree	53 cases

The etiological factors were as follows:

(1) Mine accidents	225 cases
(2) Falls	36 cases
(3) Automobile accidents	19 cases
(4) Train accidents	11 cases
(5) Gunshot wounds	3 cases
(6) Thrown from sleigh	2 cases
(7) Struck by steam shovel	1 case

It is apparent that a great many of these patients received other injuries in addition to the spine lesions which, in many instances, made a modification of our plan of treatment necessary, and in some instances prolonged disability periods, but since the treatment of these associated injuries was that ordinarily employed I am omitting any detailed tabulation or discussion of them.

Thirteen patients developed sequelae that were believed to be related to the injury. These have been classified as follows:

(1) Cardiac lesions (in cases with traumatic asphyxia)	11 cases
(2) Renal calculus	1 case
(3) Hyperthyroidism	1 case

The ages of the patients in this series ranged from 9 to 70 years, the average age being 34.1 years.

The diagnosis of a fracture of the spine should not be difficult. I shall not enter into a detailed discussion of the physical signs and symptoms here; suffice it to say that by obtaining a careful, detailed history with particular reference to the method by which the injury was sustained,

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*Read in Section on Bone and Joint Surgery, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*From the Traumatic Section of the Montgomery Clinic and the Coal Valley Hospital, Montgomery, West Virginia.

by doing a careful and complete general physical and neurological examination, and by taking satisfactory x-ray films in the anteroposterior, lateral and oblique planes, ample data should be obtained, not only to make the diagnosis, but accurately to localize the lesion or lesions. We must bear in mind, however, that x-ray films taken immediately after the injury will sometimes yield negative data when in reality a compressed fracture is present and can be clearly demonstrated in a week or two. Fortunately, these latent fractures are rare. Only one case occurred in this series.

After the diagnosis has been made it is of paramount importance to institute early treatment, provided the physical condition of the patient will permit. If there is marked distortion or displacement of the vetebra immediate reduction is vital to prevent cord damage. The wide diversity of opinion expressed in orthopedic literature as to the correct treatment of fractured spines, indicates clearly enough that no specific method has been adopted as being generally satisfactory. It is true that each case presents its own problems and must be treated upon its own merits, but it seems to me that the surgical profession could come more closely together in the handling of such an important problem. At the present time the individual surgeon is compelled to formulate his own plan of treatment without the assistance of any generally accepted program.

The usual method of treating vertebral fractures is with prolonged immobilization of the vertebral column, either by a long period of rest in bed on some type of hyperextension frame, by the use of a plaster cast, back brace, or some combination of these methods. Some of these methods violate the surgical principles that should be employed in the treatment of fractures. When a patient is at rest in bed the metabolic processes are at their lowest levels, the circulation is poor, proper elimination is rather difficult to maintain, and he often has little to do but think of himself. This absence of mental diversion is likely to foster numerous other unimportant complaints so that eventually a certain percentage of these patients will develop the usual psychoneurotic syndrome which we all know well and greatly dislike.

Some surgeons elect to do an immediate laminectomy on those patients with cord lesions, provided, of course, that the general condition will permit. These energetic surgeons have submitted many patients to the ordeal of laminectomy without beneficial results, thus adding further pain and increasing the seriousness of an already serious injury. It is a known fact that damage to the spinal cord above the lumbar segment is permanent because the non-medullated nerve fibers which make up the cord above this level are not capable of regeneration. This is not true in lesions involving the cauda-equina, since these nerve fibers are medullated and are, therefore, capable of regeneration. Patients with injuries below the lumbar segment may be benefited by laminectomy. I am of the opinion that laminectomy has no place in the treatment of fractured spines, with or without cord injuries, unless there are definite bony spicules or bony displacement causing pressure on the cord, signs of increasing paralysis believed to be due to hemorrhage, or unless the lesion involves the cauda-equina. Even in this group of cases the end results are usually not gratifying. In this series eight laminectomies were performed on patients with cord lesions. Two had received gunshot wounds; the others had compressed fracture-dislocations of one or more bodies of the vertebrae, with pressure on the cord. In these cases, even after the pressure was removed, we were unable to demonstrate any definite beneficial results. The paralysis persisted and those patients whose injuries were an incident of their employment were awarded a total permanent disability. The number of cases in any series that will be benefited by laminectomy is relatively small. The surgeon is confronted with the necessity of making a decision as to whether or not he will doom those few who might possibly be benefited by laminectomy in order to avoid the possibility of harming others by carrying out a surgical procedure that will fail to afford any appreciable benefit to the great majority. We believe that a conservative viewpoint is the least dangerous and will ultimately show the largest percentage of good results.

Cordotomy, according to Allen, advances a field for further research work, and has possibilities, but the time in which it must be done is so short that it offers no help to most of the patients I have been seeing.

It is of fundamental importance to recognize that a fracture of the vertebra differs very little from any other fracture and will heal just as readily if given the same opportunity to do so. If a fractured vertebra is properly reduced, properly immobilized, and the proper after care is employed, the end results will be just as good as in fractures elsewhere. Furthermore, the time

required to obtain healing should be very little, if any, longer than in the other major types of fractures.

The old accepted treatment of fractures of the cervical spine, of which there were 18 cases in this series, has been reduction, immobilization in plaster casts for six to eight months, followed by a leather collar for another 6 to 12 months. I do not believe that this is necessary or desirable, and have entirely discarded this plan of treatment. Proper immobilization and satisfactory end results cannot be obtained by this method of treatment since it allows the cervical muscles to contract and possibly become permanently shortened. Hemorrhage into the soft structures, which occurs frequently at the time of injury, organizes and forms scar tissue which tends to shorten the muscles and limit their function, resulting in a partial disability which may be permanent.

I prefer to use head traction for the reason that the muscles are kept taut, which is of service in reducing scar tissue formation and preventing shortening and, therefore impairment of the function of the cervical groups of muscles. All of my patients have from 8 to 12 pounds of weight for head traction applied as soon as the diagnosis of a fractured cervical vertebra is made. Traction is increased by elevating the head of the bed on shock blocks which permits the patient's body to be used as counter traction. This traction is maintained until there is firm union. Sand bags may or may not be used for support. The time required for firm union is usually from six to eight weeks. Progress in healing is checked by frequent x-ray examinations. After the first few days, with the traction intact, the patient is encouraged to rotate the head gently from side to side. Gentle massages and bakings are instituted at this time and used twice daily. When the x-ray studies show solid union the traction is removed, but the patient is kept in bed for another week, during which time he (or she) is receiving massages and bakings. At the end of this time he (or she) is allowed to sit up and is encouraged to walk about. These patients are discharged from the hospital as soon as their general condition will justify it. An effort is made to have massages and bakings continued at home. They are kept under observation from two to four months after leaving the hospital, and are then discharged from observation with instructions to return to their normal duties. Collars, or other types of support, are not used after removing the traction. My results have thus far been entirely satisfactory, inasmuch as I have been able to discharge all of the patients in this limited series permanently cured and without symptoms in from four to six months. The shortest disability period was that of a boy who had a compressed fracture of the third cervical vertebra, with pressure on the cord, who returned to school in two and a half months. The end results compare very favorably with those cases that I treated earlier by the cast and collar method, which carried from 12 to 18 months' disability.

In my treatment of fractures of the spine involving the thoracic and lumbar segments, I use what might be called the closed method of reduction. Since the plan of treatment to be described permits the patient to be up after only a short period in bed, instead of keeping him confined in the horizontal position, I have elected to call it the ambulatory method. For the past seven years I have treated my uncomplicated cases as follows: The patient is kept on a hyperextension frame for two days, during which time the spine is gradually hyperextended. This preliminary treatment is essential in those cases that develop abdominal distension. Many of my patients have developed abdominal distension which I believe to be due to retroperitoneal hemorrhage with associated adynamic ileus. This distension is controlled by decompression of the upper alimentary tract with a Levine tube, and of the lower alimentary tract by the use of a rectal tube and enemata. As soon as the distension subsides the patient is given morphine sulphate and scopolamine, and after a suitable interval is transported to the cast room. He is transported face down and placed upon two tables which have been placed so that there is a space between slightly greater than the length of the patient's trunk. One table is elevated about 12 inches higher than the other. Two assistants are used to apply traction to the extremities, one to the upper and one to the lower. The spine is permitted gradually to assume the hyperextended position. No time need be allowed for this, as this position will be attained while the cast is being applied. All protuberances are well padded with felt or cotton, and the cast applied. Experience has shown that the cast must extend up to the sternoclavicular articulation and down to the symphysis pubis in front, and well down over the trochanters of the femora laterally. It must also be well molded to the contour of the hyperextended spine. In only one case did we find it necessary to include the lower extremities in

the cast. After the cast has dried sufficiently small areas are cut out under each axilla so that the upper extremities can be used with comfort. The cast is also cut to permit flexion of the thighs. The patient is allowed up as soon as the cast has dried, usually within 24 hours. He is encouraged to walk about. The following exercises are employed in order to strengthen the abdominal muscles and the erector spinae muscles: the patient lies flat in bed and the lower extremities are allowed to hang over the side of the bed. Lying flat on his abdomen, the head is raised against resistance. The lower extremities are raised, hyperextending the hip joints. He is instructed to raise the trunk by extending the upper extremities while the weight is borne on his hands. He is further instructed to walk up and down steps or stairs carrying weights on his head and shoulders. Such exercises, although simple to carry out, involve energetic contraction of the erector spinae and abdominal muscles. Despite the plaster cast the patient can, and does, maintain better muscular tone in this way than he would if any amount of massages and bakings were possible. These exercises increase his circulation, thus aiding in increasing his appetite and elimination.

Getting these patients out of bed as soon as possible is a very necessary part of the treatment. It not only assists in maintaining muscular tone, elimination and normal circulation, which is essential in rapid union, but maintains a normal, wholesome, mental attitude. The sooner a man is dispossessed of the notion that he has a broken back and that he will never walk or work again, the more certain we are of avoiding a traumatic neurosis.

I protect my patients with plaster paris casts for a period of three months. To maintain adequate hyperextension it is sometimes necessary to change these casts two or three times during this period.

At the end of three months the cast is removed and the patient is fitted with a Taylor back brace. The same exercises, plus massages and bakings are carried out. The patient is permitted to sleep without the brace. X-ray pictures are taken at intervals while the cast and braces are worn, and a final discharge x-ray picture is made. The brace is usually worn for a period of four to six months, after which all support is discarded. At the end of this period the patient is ready to begin light work, for a few weeks, preparatory to returning to his former occupation. In the non-complicated cases he (or she) should be able to return to work with a maximum disability period of 12 months. Some of the industrial cases have returned to work in a period as short as six months, but the majority are disabled from eight to 12 months. Even after they have returned to work they are asked to return for x-ray examinations two or three times a year for a period of two years. This affords the injured individual added protection and might be of service in detecting the vertebra that failed to heal properly and is beginning to show signs of destruction.

I have never found it necessary to use the Bohler method of reduction in which local anesthesia is given at the site of the lesion. Neither have I found it necessary to use a general anesthetic with forcible manipulation and reduction as described by Dunlop. (See *Figs. 1, 2, 3.*)

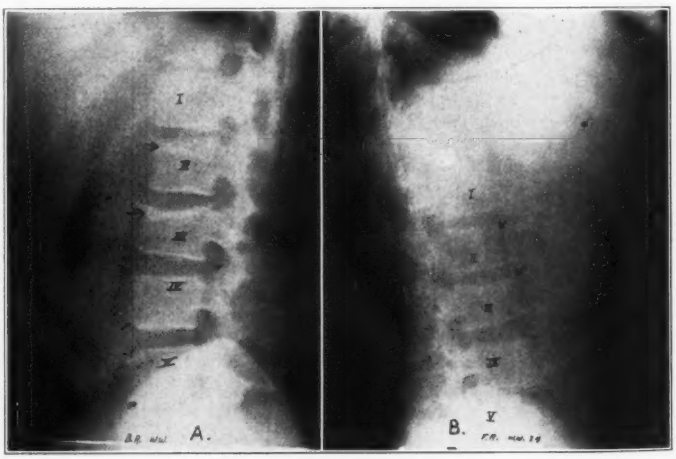

Fig. 1

(A) Lateral view of the lumbar spine showing a compressed fracture of the bodies of the second and third lumbar vertebrae. Also a lipping of the anterior borders of the fourth and fifth lumbar vertebrae before reduction.

(B) End results four months after reduction and immobilization. Note the contour of the bodies of the vertebrae which have practically returned to normal.

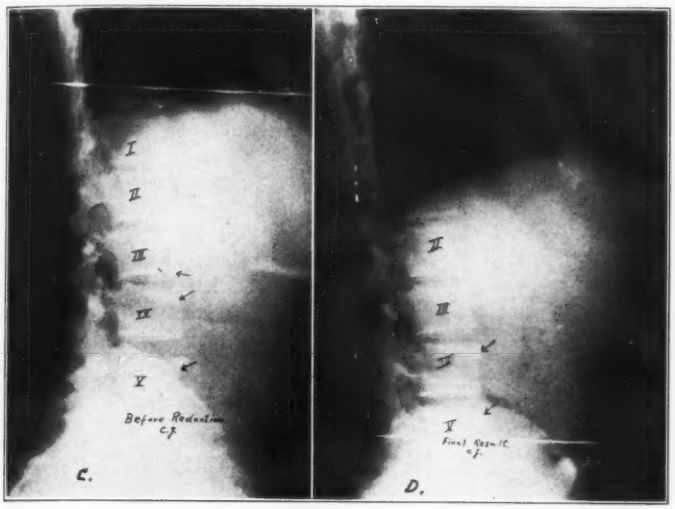

Fig. 2

(C) Compressed fractures of the fourth and fifth lumbar vertebrae with a fragment chipped off the anterior superior border of the fifth lumbar vertebra. Also note the lipping of the body of the third lumbar vertebra.

(D) Final result six months later in which the bodies of the vertebrae have practically returned to normal save for slight bony projection from the anterior superior borders of the fourth and fifth lumbar vertebrae.

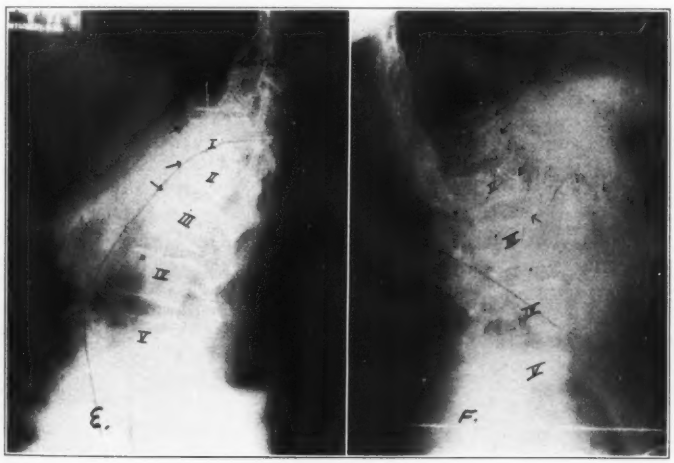

Fig. 3

(E) Compressed fractures of the first and second lumbar vertebrae with a detachment of a fragment from the anterior superior border of the third lumbar vertebra. Note the marked proliferative arthritis of the lower throracic and upper lumbar vertebrae with pathological fusion of the anterior borders. The proliferative arthritis made reduction very difficult due to an almost "poker spine."

(F) Final result four months later in which the contour of the second lumbar vertebra has practically returned to normal. The wedge-shaped deformity of the first lumbar vertebra persists due to pathological fusion of the superior anterior border with the twelfth thoracic vertebra.

In my method of reduction I would be at a distinct disadvantage if the patients were asleep. A hypodermic of morphine sulphate and scopolamine has been adequate to control pain in all of these cases.

In patients with cord lesions the same method of treatment is carried out as soon as the patient's physical condition will permit. (See *Fig. 4.*)

These patients with cord lesions have to be kept in bed for several weeks. The paralyzed extremities are protected from decubitus ulcers and deformity by padding the dependent portions with felt or cotton and molding a posterior shell to the extremities. This prevents deformity and gives access to the extremities for massages and manipulations. Free elimination is always maintained. I have never hesitated to insert a retention catheter into the bladder to care for acute retention. The catheter should be irrigated at least once a day with boric acid solution, followed by the instillation of 10 c. c. of 10 per cent silver nitrate. To prevent urinary sediments from forming the catheter is changed quite frequently. I have found this method more satisfactory from the surgeon's standpoint and more comfortable from the patient's standpoint than repeated catheterization, which will almost invariably result in a urinary tract infection.

As soon as the patient's condition will permit he is permitted up in a wheel chair and is encouraged to roll it around for the physical exercise it affords. When union of the spinal fracture has been obtained, usually in from two to four months, fixation of the spine is no longer necessary. At this stage the cast is removed. The nutrition of the skin is sufficiently improved to render the occurrence of pressure sores unlikely and a more active life should be enjoyed. A properly prepared wheel chair, in which the patient may move about, is essential. Cases with partial recovery, or paralysis of a portion of one extremity, I have made ambulatory by the use of braces not unlike those used in infantile paralysis. In cases where foot drop persists, due to a permanent involvement of the anterior tibial nerve, I have applied properly fitted foot drop braces which have proven very satisfactory in the correction of this deformity. These patients are then suited to resume some type of gainful occupation.

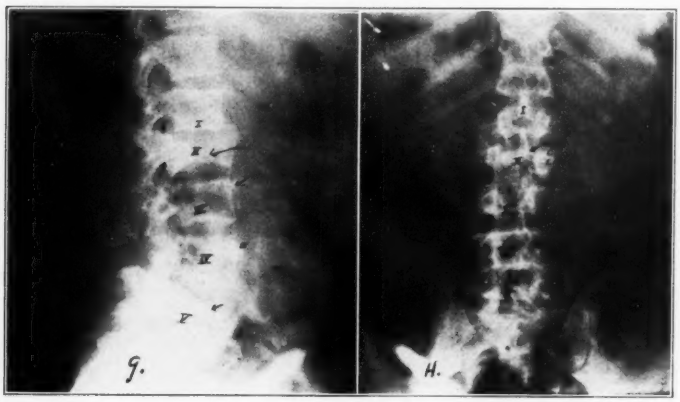

Fig. 4

(G) Lateral view of the lumbar spine showing compressed fracture-dislocation of the third lumbar vertebra. Note the displacement of the body posteriorly, obliterating the neural canal. There is also lipping of the anterior superior borders of the third and fourth lumbar vertebrae. There is a fracture of the spinous process of the first lumbar vertebra.

(H) Anteroposterior view showing marked crushing of the body of the second lumbar vertebra with lateral displacement of the fragments. This patient had partial severance of the cord with paralysis of the lower extremities. No improvement was noted after manipulation.

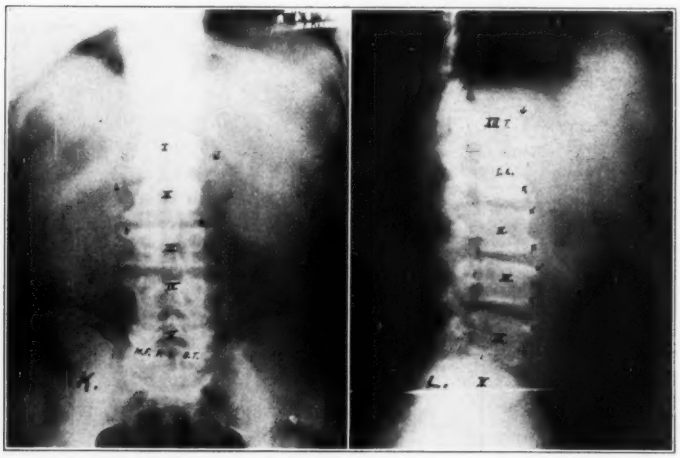

Fig. 5

(K) Anteroposterior view of the lumbar spine showing multiple fractures of the transverse processes of the lumbar spine. Note the marked proliferative arthritis of all the lumbar vertebrae.

(L) Lateral view. Note the exostosis extending out from the anterior borders of all the lumbar vertebrae. The disability period was prolonged by the pathological changes in the lumbar vertebrae resulting from the proliferative arthritis. This type of case should be immobilized in plastic cast for four to six weeks.

In the treatment of fractures of the transverse processes I use the plaster cast only in those cases that have several processes fractured on each side. (See *Figs. 5* and *6*).

I believe that immobilization by adhesive strapping is the method of choice in selected cases. During the first week the patient is kept in bed and receives heat and gentle massages to the affected zone. At the end of a week the acute symptoms have usually subsided, the spine is strapped tightly with adhesive, and the patient is permitted to get up. Shortly thereafter he is discharged from the hospital with instructions to return once a week for treatment, which consists of gentle massages and electric bakings for a 30-

Fig. 6

Lateral view of the lumbar spine showing wedge-shaped deformity of the anterior borders of all the lumbar vertebrae and a fracture of the neural arch between the fourth and fifth lumbar vertebrae. Note the exostosis extending from the anterior inferior borders of the third and the anterior superior and inferior borders of the fourth lumbar vertebrae.

minute period. The back is reimmobilized with adhesive after each such treatment, which is continued for four to six weeks. At the end of this period he is usually ready to be discharged from observation and permitted to return to his usual occupation. The maximum period of disability in the uncomplicated cases should not exceed two months. Some patients, who were engaged in office work, returned to duty in two weeks.

The 79 cases with fractures of the transverse processes had the following disability period:

DISABILITY PERIOD IN 79 FRACTURES OF THE TRANSVERSE PROCESSES

No. Cases	Per Cent	Weeks of Disability
4	.5	2
15	1.0	4
13	1.5	6
12	2.0	8
14	3.0	12
6	4.0	16
2	5.0	20
3	6.0	24
4	8.0	32
3	9.0	36
3	25.0	100

Average percentage, 5.9. Average weeks, 23.6.

The 151 dorsolumbar fracture cases, without cord lesion, had the following disability period:

DISABILITY PERIOD IN 151 CASES OF DORSOLUMBAR FRACTURE

No. Cases	Per Cent	Weeks of Disability
1	75	300
4	60	240
18	50	200
3	45	180
3	40	160
5	35	140
4	30	120
5	25	100
3	22	88
5	20	80
12	15	60
20	12	48
12	11	44
10	10	40
16	9	36
14	8	32
9	6	24
4	5	20
2	3	12
1	1	4

Average percentage, 24; average weeks, 96.

Fifty-three additional cases had cord lesions, with 100 per cent disability. Seventeen of these patients died.

These figures compare very favorably to the end results of cases treated by other physicians of the state as based on the Compensation Commission's figures, the average percentage of disability being 48.1 per cent, or 192.4 weeks.

There were 18 cervical spine injuries. One death occurred in this series. The remaining 17 cases had the following disability period:

DISABILITY PERIOD IN 17 CERVICAL SPINE INJURIES

No. Cases	Per Cent	Weeks of Disability
1	18	72
1	12	48
5	10	40
10	6	24

Average percentage, 7.7; average weeks, 30.8.

Those cases having above 6 per cent disability were compensation cases, and a greater award was given by the Compensation Commission. The 10 cases that had 6 per cent disability were private cases, three of whom were females.

CONCLUSION

In the treatment of the 301 cases mentioned in this paper I have tried to adhere to the surgical rules and principles applied in the treatment of any other fracture, realizing that a fracture of the spine will heal just as readily as a fracture anywhere else, if properly reduced, immobilized and subsequently followed through. By the treatment outlined above it has been possible

to reduce the disability period in those cases at least one-half, my conclusion being based on an average disability period of 24 per cent, as compared to 48.1 per cent, which figures were obtained from the West Virginia State Compensation Commission.

REFERENCES

1. Osgood, Robert B.: Compression Fractures of the Spine: Diagnosis and Treatment. J.A.M.A., **89**:1563-68, Nov. 5, 1927.
2. Wilmoth, Clifford Lee: Fractures of the Lumbar Vertebrae Due to Hyperextension and Extreme Muscular Action. J.A.M.A., **91**:6-8, July 7, 1928.
3. Davis, Arthur G.: Fractures of the Spine. Amer. Jour. Surg., **15**:325-335, Feb., 1932.
4. Dunlop, John; and Parker, Carl H.: Correction of Compressed Fractures of the Vertabrae. J.A.M.A., **94**:89-92, Jan. 11, 1930.
5. Eikenbary, C. F.: Compression Fractures of the Vertebrae: Suggestions as to Treatment. J.A.M.A., **91**:1694-1697, Dec. 1, 1928.
6. Conwell, H. Earl: Acute Fractures of the Spinal Vertebrae without Cord Injury. Wis. Med. Jour., **31**:230-239, April, 1932.
7. Angwin, W. A.; Robins, J. H.; and Miller, M. G.: Late Treatment of Cord Compression Fracture of the Spine. Jour. Bone & Joint Surg., pp. 156-159, Jan., 1930.
8. Mitchell, C. Leslie: Isolated Fractures of the Articular Processes of the Lumbar Vertebrae. Jour. Bone & Joint Surg., **15**:608-614, July, 1933.
9. Jones, R. Watson: The Treatment of Fractures and Fracture Dislocations of the Spine. Jour. Bone & Joint Surg., **16**: 30-45, Jan., 1934.
10. Johnson, H. J.: Compression Fractures of the Spine. Neb. State Med. Jour., Jan., 1927.
11. Feaster, O. O.: Delayed Appearance of Deformity in Vertebral Body Fractures. J.A.M.A., **102**:598-599, Feb. 24, 1934.
12. Quaintance, Paul A.: Fractures of the Transverse Processes of the Lumbar Vertebrae. Arch. Surg., **19**:968-985, Dec., 1929.
13. Davis, Arthur G.: Fractures of the Spine. Jour. Bone & Joint Surg., **11**:133-156, Jan., 1929.
14. Jones, R. Watson: Manipulative Reduction of Crush Fractures of the Spine. Brit. Med. Jour., No. 3659:300-302, Feb., 1921.
15. Watkins, James T.: Fractures of the Spine. Calif. & West. Med., **39**:246, Oct., 1933.
16. Atha and Sevier: Corrective Treatment of Compression Fractures of the Spine. Colo. Med., **30**:252, July, 1933.
17. Felsenreich, Fritz: Modern Treatment of Uncomplicated Compression Fractures of the Thoracic and Lumbar Spine. Arch. fur. klinische Chirurgie, **176**:122, Aug. 24, 1933.
18. Geissler: Partial Disability After Vertebral Fractures. Med. Klin., **26**:1195-1196, 1930.
19. Mock, Harry E.: The Management of Fractures of the Spine. Internat. Jour. Med. & Surg., **46**:451, Oct., 1933.
20. Boehler Lorenz: Further Experience with Treatment of Vertebral Fractures. Arch. fur. Klinische Chirurgie, **177**:424, Oct. 18, 1933.
21. Fulton, W. S.; and Kalbfleisch, W. K.: Accessory Articular Processes of the Lumbar Vertebrae. Arch. Surg., **29**:42-48, July, 1934.

DISCUSSION (*Abstract*)

Dr. Frederick A. Jostes, St. Louis, Mo.—The speaker has presented an amazingly large series of fractures dating over a short period of time. There can be no question, as he says, that each of these fractures must be treated individually and that there can be no fixed method of treatment.

In spinal cord injuries, I have seen very few good results following laminectomy. Laminectomy, of course, should be done only in cases where the Queckenstedt test shows that there is definite obstruction.

Fractures and fracture dislocations of the cervical spine should be reduced early. As a rule, we use the Taylor method of reduction. Complete fixation for the first three months we find necessary, and later a removable collar for a period of six months. In old cases we use traction for a period of ten days or two weeks before reduction is attempted.

Dr. Stallard mentioned the use of adhesive strapping in the fractures of transverse processes. I wonder if Dr. Stallard will be good enough to tell us how to strap a back completely to immobilize the back.

We keep our patients flat on their backs six or eight weeks, either in a hyperextended bed or with the spine in a plaster cast in hyperextended position.

In the next period of six or eight months the patient wears a celluloid jacket, again in hyperextended position.

Dr. Stallard is to be congratulated on his very excellent results and upon his ability materially to reduce the period of disability.

Dr. H. Earle Conwell, Birmingham, Ala.—We cannot standardize the treatment of compressed fractures of the spine any more than any other surgical condition. The reduction of the anterior compressed vertebral fracture is necessary and usually possible; however, the method of the reduction should not be carried out to the detriment of the patient.

In the case with a slight anterior compression with moderate shock, abdominal distention and local trauma, early reduction under a general anesthetic may be carried out. In contrast, however, to this type of case, we have the severe anterior compressed spinal fracture with marked abdominal distention and severe shock in which reduction under general or local anesthetic if carried out immediately would jeopardize the life of the patient.

Most anterior compressed fractures of the spinal vertebra which I see are of the latter type, or of the border-line case. I treat such cases with slow, gradual hypertension. I believe that our results have been as good as the average with any other method, and the functional results have been equally good. I have not had any deaths resulting from this treatment.

In the majority of my cases, if immediate reduction under general or local anesthetic were carried out and a plaster cast applied with the usual post-traumatic symptoms present such as abdominal distention and shock, it would seriously jeopardize the life of the patient. It is poor surgical judgment to carry out immediate reduction and apply a circular body cast in this type of case.

Too early weight-bearing should not be allowed, certainly not before three or four weeks. The treatment of anterior compressed vertebral fractures should be carried out individually, each case being treated according to the physical condition present.

Last, but not least, it has been suggested to me by Dr. Thomson, one of our distinguished visitors, that one of the most important things in the treatment of fractured spines has not been brought out today, and that is the first aid treatment. These patients should be fixed in some way to prevent further flexion of the spine, either with a ladder splint, or when that is not possible, the patient should be supported with the face down when transporting him. First aid in any fracture lessens the period of convalescence and in many cases saves lives.

Dr. Stallard (closing).—I do not consider the use of adhesive strapping of fractures of the transverse processes essential. The transverse processes are too deeply situated for immobilization to be attained. The patient

is more comfortable with the adhesive strapping and it is for this reason only that it is employed.

Since these patients are suspended in the air while the spine is hyperextended, I do not employ general anesthesia for the following reasons: first, it is not necessary. Second, if the patient were anesthetized we should be at a definite disadvantage, inasmuch as we should have an unconscious patient to deal with.

The surgical profession is thoroughly in accord with me when I state that each injured patient is a separate problem. It is only necessary for the surgeon to use common sense and good surgical judgment in all these cases. We are able to immobilize some of them immediately, but since the treatment of individual cases will vary, depending upon the condition of the patient and associated factors, I have found it better to wait from twenty-four to forty-eight hours so that any abdominal distention will be taken care of before attempting to manipulate and immobilize the spine in a cast. During this period of time the patient is kept on a Goldthwait hyperextension frame.

THE DIAGNOSIS OF DIVERTICULITIS AND DIVERTICULOSIS OF THE COLON*

WITH SPECIAL REFERENCE TO THE ROENTGEN STUDY OF THESE CONDITIONS

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The term diverticulosis of the colon is used to denote the presence of one or more diverticula without symptoms or the presence of an inflammatory reaction referable to the diverticula. The term diverticulitis of the colon is used to denote the presence of diverticula with accompanying symptoms and an inflammatory reaction of varying degrees.

Diverticula of the colon were first reported by Cruveilhier in 1849 and Virchow in 1853. The pathology of this condition was first described by Graser in 1898.

In 1914, Abbe reported the first case of diverticulitis of the colon diagnosed by roentgen study prior to operation. This roentgen study was made by LeWald. In February, 1915, Case and Carman reported cases of diverticula of the colon, each writer working independently.

The surgeon, internist and roentgenologist should all be especially interested in these conditions. Diverticula of the colon should, when seen by the roentgenologist, always be reported to the surgeon and internist even though no symptoms are elicited referable to them. By their location and character this information is often of grave import, especially if they become inflamed at a later date.

Since Carman's report and description in 1915, roentgenologists throughout the world have been reporting these conditions in great numbers. The examiner who is "diverticula conscious" as a rule finds more than the one who is not so zealous. Case states that about one in eighty of his routine gastro-intestinal examinations reveals one or more diverticula of the colon and we feel that our incidence is at least as frequent as that.

Many classifications have been suggested, the more frequent ones being: acquired and congenital, true and false. They may be also termed mechanical and inflammatory. The diverticula which interest us are practically always false and acquired.

Diverticulosis of the colon usually gives no symptoms referable to the diverticula, but these patients often give a history of chronic constipation and the roentgen study demonstrates one or many hernial protrusions in the wall of the gut. Note should always be made of the presence of these diverticula with reference to site, number, size, and so on, as a diverticulitis can be and is often a sequel of diverticulosis.

Case subdivides diverticulitis into three types:

(1) The enterospasm type
(2) The hyperplastic type
(3) The pseudo-appendicitis type

The enterospasm type is represented by the presence of many scattered diverticula with symptoms only of enterospasm which is caused by the irritation of the intestines from the retained contents in the diverticular sacs. This is spoken of by some writers as the prediverticular stage of diverticulitis.

The hyperplastic type consists of those cases where the diverticula are close together, causing peridiverticular inflammatory reactions with production of connective tissue, which tends to produce a tumor with more or less obstruction. This type is sometimes complicated with carcinoma and often simulates carcinoma; at times it is very hard to differentiate the two conditions.

The pseudo-appendicitis type is represented by the cases in which the diverticula become acutely inflamed. This may occur in the presence of one or more diverticula, most frequently seen in the left lower quadrant, but may involve

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*Read in Section on Radiology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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any portion of the colon. We have seen this type in the right upper and right lower as well as in the left lower quadrant.

Diverticula may be present in any or all parts of the colon, but the most frequent site is the rectosigmoid region. The writer has seen several cases with involvement of the hepatic flexure which simulated cholecystitis. If one is suspicious the entire colon should be studied carefully and the unusual sites subjected to the most critical examination. Diverticula are often seen in the right side of the abdomen and a diverticulitis here very closely resembles appendicitis, but can usually be differentiated by roentgen examination. The author has seen and diagnosed one case of diverticulosis of the appendix. At the time of the examination, the appendix was present in an inguinal hernia. There were no symptoms referable to the appendix, but the patient had many diverticula also present in the sigmoid and proximal rectal area, none of which were causing symptoms. This patient was 74 years old and suffered from chronic constipation and indigestion.

We are reporting in this communication one case of diverticulosis in which diverticula were demonstrated to the number of three hundred or more. Every inch of the colon was involved. This patient complained of no pain or other symptoms referable to the diverticula, but did have a profuse colonic hemorrhage, which was unexplained. He also gave a history of chronic constipation with a similar hemorrhage seven years previous to this one. At present, ten years since the x-ray examination, he is enjoying good health with no symptoms referable to his diverticula. One of his five brothers died from a ruptured diverticulum.

Many theories have been advanced to explain the cause of these conditions, none of which adequately explains their occurrence. These, however, are pertinent facts:

(a) Most cases occur in patients past forty years of age, usually in men who are overweight and victims of chronic constipation, but diverticula do occur in the young and aged. In our series of seventy cases there were forty-three males and twenty-one females; the oldest a man of 74 and the youngest a boy of 17. Erdman and Ashhurst report the presence of diverticula in patients of 6 and 7 years of age, respectively.

(b) The sigmoid may be the site of predilection, as it contains a quantity of gas and fecal matter under more or less pressure.

(c) The points of entry for blood vessels passing through the intestinal wall are common sites for diverticula.

(d) Another predisposing factor may be a variation in the size of the blood vessels as found in congestion from venous obstruction, or high arterial pressure in cardiorenals or advanced arteriosclerosis.

(e) There may be a congenital predisposition. We have two cases in brothers in the same family.

(f) Weakness of the muscles of the intestinal wall may predispose to diverticula.

Diverticulosis as a rule produces no symptoms, but is usually discovered in the routine roentgen examination of the gastro-intestinal tract. It is characterized by the presence of one or more non-inflamed diverticula scattered throughout the colon. Sometimes a diverticulitis is present in a patient along with a diverticulosis.

Diverticulitis practically always causes symptoms which vary in degree, depending upon the amount of reaction in and around the diverticula pouches. Telling estimates that 60 per cent of patients having diverticula of the colon may have symptoms, and our experience will certainly corroborate this. The early symptoms are usually not different from many other abdominal conditions; one may have abdominal discomfort or pain which is not related to food intake, the site of this pain being usually about or below the umbilicus; most frequently low down in the left side of the abdomen. Bladder irritability is a frequent symptom and is associated with localized tenderness in the lower abdomen. Constipation is the general rule, but this may be associated with an alternating diarrhea. Blood in the stools is rarely seen, but may be present. We have seen a case which had two severe hemorrhages without any other symptoms except a chronic constipation. Hemorrhage always makes us suspicious of malignancy which sometimes complicates diverticulitis. Colic is sometimes present and tends to recur frequently. We often have a low grade fever accompanied by a moderate leukocytosis. These symptoms may become aggravated or subside as in subacute or chronic appendicitis; muscle rigidity may be present or absent.

An acute attack of diverticulitis often simulates acute appendicitis; it is usually ushered in by severe pain in the left lower quadrant, but may be at any point in the abdomen and may or may not be associated with muscle rigidity, nausea and vomiting. There is usually a low

grade temperature with a leukocytosis. The attack may last for a few hours or for several days, terminating by lysis or may go on to suppuration, abscess formation and peritonitis. In these acute cases surgery is often in immediate demand. Although the left lower quadrant is the usual site of diverticulitis, we must remember that any part of the colon may be involved, even the head of the cecum and the appendix. The writer has seen several cases of diverticulitis of the hepatic flexure in which cholecystitis was diagnosed incorrectly both by the internist and the surgeon.

An acute diverticulitis of the colon should always be considered a surgical condition and the diagnosis is usually made by the history and the more or less typical symptoms. In certain selected cases the roentgen study used cautiously is of value.

The obstructive type gives symptoms of a chronic constipation often with a history of several acute attacks and an increasing obstinate constipation with a palpable tumor, which disappears at intervals to return in a few days. This type is sometimes associated with carcinoma and can be differentiated only by use of the roentgen ray.

THE ROENTGEN STUDY

Many roentgenologists and internists argue the relative values of the barium meal and the opaque enema in diagnosing the presence of diverticula in the colon. They are both of value in the chronic and subacute cases, but the barium meal should never be used in acute or obstructive cases. The opaque enema may be used as a diagnostic measure in certain selected acute cases and those with partial obstruction. Many acute cases are studied by us with the enema after they have been cooled off by rest in bed, ice packs, restriction of diet, and so on, for varying periods of time.

In the majority of cases the meal and enema combined give the most information. Our procedure as a general rule is to make a preliminary film of the entire abdomen in the anteroposterior position with the patient on the Potter-Bucky diaphragm. This is done to detect any abnormal densities such as gallstones, kidney stones, calcified glands and other things which might cause confusion. We then give a barium meal as used in routine gastro-intestinal study, observing the esophagus, stomach and small intestine with the fluoroscope and making the necessary films indicated in the study of the upper intestinal tract. Patients are sometimes seen with diverticula in the esophagus, stomach and duodenum in addition to a number of them in the colon.

Some roentgenologists prefer to give a buttermilk barium meal, as they think that the diverticula are easier to demonstrate with this particular type of meal. Many years ago we used the buttermilk meal exclusively, but for the past eight or ten years we are finding as many diverticula with the malted milk meal. We still occasionally use the buttermilk meal. In suspected cases of diverticulitis of the colon we find it advisable, especially in selected acute cases and subacute cases to employ the barium enema first. We have much better control over the enema than over the meal, enabling us to study the localized areas of tenderness more thoroughly and we can note under the fluoroscope the reactions of the various portions of the gut to the injected medium.

In the suspected chronic cases, or as a matter of fact, in the unsuspected cases, our experience has been that more cases of diverticula of the colon have been diagnosed by use of the opaque meal than by the enema. By far the most of our cases of diverticulosis have been discovered in the routine gastro-intestinal examination of patients who had no symptoms referable to the diverticula.

Many of our cases of diverticulitis of the colon have been referred by the clinician or surgeon with a diagnosis of chronic or subacute appendicitis, cholecystitis and carcinoma of the sigmoid. In a big percentage of cases we can either confirm or refute these diagnoses. Occasionally one or more of the above named conditions is seen co-existing with a diverticulitis and both conditions give very definite symptoms.

The routine roentgen study of the gastro-intestinal tract is usually sufficient to determine the presence of diverticula of the colon, but where they are suspected and not seen in the routine study it is a wise procedure to continue the fluoroscopic and film studies for several days following the ingestion of the meal. We have demonstrated the filling of diverticula three to five days after the meal was given, and they may remain filled for two or more weeks. We have seen one case of diverticulosis in which one hundred or more diverticula remain filled eight days following the ingestion of the meal and twenty-four hours after subsequent purgation with two ounces of castor oil and many cleansing enemata.

Many times during the routine roentgen study of the gastro-intestinal tract with the opaque meal or enema we see no diverticula, but notice areas of spasticity of the colon with numerous serrations; so-called "saw tooth deformity." Should no diverticula be demonstrated in these cases, a re-examination should be made in a week or ten days with another barium meal, this to be followed by an opaque enema. In this way we are often able to demonstrate diverticula and confirm our suspicion of a diverticulitis. Some writers speak of this spastic manifestation with serration as the pre-diverticular stage of diverticulitis, which it often is, but most acute and many subacute cases of diverticulitis show this inflammatory reaction also.

If these areas of spasticity show marked localized tenderness we have found it advisable to put the patient to bed for several days on a restricted liquid diet and re-examine with the opaque enema after the acute symptoms have subsided. By this method we have often been able to make a definite diagnosis of diverticulitis with or without partial obstruction.

Early one morning the author was called by a prominent internist to make a roentgen study of a very sick patient who had been diagnosed by the internist and surgeon as having a left-sided acute appendicitis. Upon palpation a small tumefaction could be felt in the left lower quadrant, which was very tender to pressure. The patient was transferred to the roentgen department and an oil emulsion barium enema given under fluoroscopic control with great care and gentleness. The proximal sigmoid and distal portion of the descending colon showed marked spasticity with the saw tooth appearance noted in acute diverticulitis. No diverticula were demonstrated, but the head of the cecum was in its normal position, being freely movable, and no tenderness was elicited upon pressure over it. We made a tentative diagnosis of diverticulitis of the proximal sigmoid, advised the use of ice caps over the tumefaction and restriction of foods to liquids. On the following day the patient evacuated about one ounce of pus by rectum. Soon after this his acute symptoms subsided. After several days' rest in bed further roentgen study was made by use of the opaque meal and the enema, which showed many diverticula of the sigmoid, with one very large pedunculated diverticulum which had undoubtedly ruptured into the colon and accounted for the evacuation of pus seen several days previous to this last examination. Very fortunately for the patient it emptied into the gut and not into the abdominal or pelvic cavity.

In the past many cases of diverticulitis of the sigmoid have been erroneously diagnosed as carcinoma which, upon careful roentgen study, would have been correctly diagnosed. Carcinoma and diverticulitis of the sigmoid are frequently seen at the same time in a patient. Repeated roentgen examination by use of the opaque enema will usually differentiate the two conditions. The surgeon should not operate too hastily upon suspected cases of carcinoma of the sigmoid, for many prove to be diverticulitis with tumefaction, which clear up with more conservative treatment. In carcinoma of the sigmoid the formation of the palpable tumor usually precedes the appearance of pain and tenderness, whereas in diverticulitis the opposite is true. It is said that about 25 per cent of cases of chronic indurated diverticulitis become malignant. In carcinoma of the colon the patient usually begins to lose flesh early and pain is not a constant symptom until obstruction is rather marked. The tumor of diverticulitis comes and goes, but the carcinoma is permanent. Left-sided appendicitis can usually be differentiated easily by roentgen study, the same being true of other pelvic lesions. Cholecystitis is sometimes difficult to differentiate from diverticulitis of the hepatic flexure, but a differential diagnosis is often made by roentgen study, using the opaque meal and enema alone or in combination with the gallbladder dye. Cases have been reported in which both conditions present in the same patient were diagnosed correctly by roentgen study; we have had two such cases. We have seen several cases with diverticula present in the hepatic flexure and the proximal third of the transverse colon which gave very definite clinical symptoms of cholecystitis in which the Graham-Cole study was negative for gallbladder disease. In these we felt justified in making a diagnosis of diverticulitis. Some of these patients we have examined at much later dates to find the diverticula still present without any symptoms referable to them.

Other conditions to be differentiated from diverticulitis are: sigmoiditis, actinomycosis, syphilis and hyperplastic tuberculosis. It is highly probable that most if not all cases of sigmoiditis are really diverticulitis in some of its stages. True sigmoiditis usually occurs earlier in life and the greater number end in spontaneous recovery. Syphilis is rarely seen in the sigmoid and can usually be ruled out by the history and other clinical tests. Actinomycosis shows different pathological and clinical developments from diverticulitis and usually occurs in the cecum. Hyperplastic tuberculosis sometimes coexists with diverticulitis, but is rarely seen in the sigmoid.

Case 1.—E. G. P., a man, 50 years old, weighing about 175 pounds, gave a history of constipation, flatulence and general abdominal distention, but no appreciable pain. The clinical diagnosis was cholecystitis.

He was examined by the use of a barium meal, followed by a barium enema. Numerous diverticula were demonstrated in the transverse, the sigmoid and the ileac colon. After a barium enema two or three small diverticula were also seen at the head of the cecum.

Case 2.—Mrs. R. E., housewife, 42 years old, weighing about 130 pounds, was well nourished and apparently in good physical condition. Her chief complaint was tenderness in the right upper quadrant and over the entire left side of the abdomen. She also complained of chronic constipation. The clinical diagnosis was cholecystitis. Examination was made by use of a barium meal followed by a barium enema, and disclosed numerous diverticula in the ascending colon, hepatic flexure, sigmoid, descending and ileac colon. During the fluoroscopic examination there was marked tenderness in the right upper quadrant and left lower quadrant of the abdomen. A Graham-Cole study of the gallbladder showed it to have normal function.

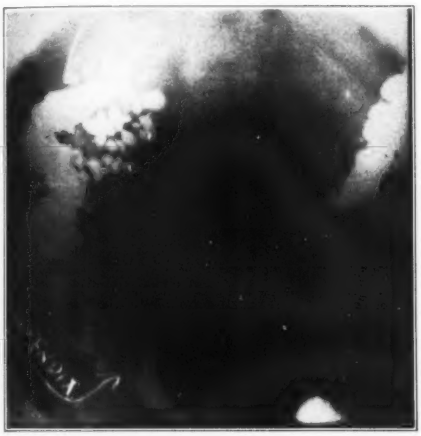

Fig. 1

Case 4. Film made twenty-four hours after ingestion of barium meal. Note that lumen of colon is filled, with numerous diverticula protruding from its wall, distributed from cecum to the sigmoid.

Case 3.—F. G., a man, about 70 years of age, weighed 180 pounds. His chief complaint was chronic constipation associated with abdominal discomfort. He had localized tenderness upon pressure over both lower quadrants of the abdomen. X-ray examination made with the barium meal followed by a barium enema showed diverticula present in the sigmoid and ileac colon. Diverticula of the appendix were shown 24 hours after the barium meal in an examintion made with the patient standing. The appendix was distinctly outlined in the sac of a right inguinal hernia and two or three diverticula were very clearly demonstrated. After the barium enema, diverticula were clearly outlined in the sigmoid and ileac colon.

Case 4.—N. R., a man, aged 50, weighed 150 pounds. Seven days before our roentgen study he had severe intestinal hemorrhage with loss of a pint or more of blood. Great difficulty was experienced in controlling the hemorrhage and the patient was put to bed for a week before x-ray examination was attempted, very little food being given during this interval. He gave a history of a similar attack several years ago, at which time no x-ray examination was made. The patient gave a history of being constipated for several years. At the time of examination and for several days previously he had suffered no pain and no tenderness was elicited during our examination. A barium meal was given and an x-ray study of his colon was made both fluoroscopically and with films over a period of seven days, ob-

Fig. 2

Case 4. Film made ninety-six hours after ingestion of barium meal. The lumen of the colon is empty of the meal, but hundreds of diverticula are seen distributed from the cecum to the rectum.

Fig. 3

Case 4. Film made one hundred twenty hours after ingestion of barium meal. The lumen of the colon is empty, but hundreds of diverticula are seen distributed from ascending colon to anus.

Fig. 4

Case 4. Film made in giving of barium enema. Note the numerous diverticula protruding from the lumen, many of which remain filled from the ingested barium meal.

servations being made once or twice daily. Immediately after this examination and after thorough cleansing of the intestinal tract with castor oil and enemata, a barium enema was given and fluoroscopic and radiographic examinations were made. Examination with the barium meal disclosed multiple diverticula involving the entire colon from the head of cecum to anus. Many of these diverticula remained filled for several days and more than a hundred could be outlined seven days after the meal and 12 hours after the giving of castor oil followed by a cleansing enema. Examination made with the aid of a barium enema also showed numerous diverticula present from the head of the cecum to the rectum. The appendix was very clearly outlined, being unusually long and segmented, but was not tender to pressure. This man is still living ten years after the examination and has had no further attacks or hemorrhages. He takes a laxative diet and keeps his intestinal tract cleansed.

CONCLUSIONS

(1) Diverticulosis of the colon is characterized by numerous sacculations protruding from the colon usually filled with fecal matter and causing no symptoms. It is recognized by roentgen study of the gastro-intestinal tract and shows no recognizable inflammatory reactions.

(2) Diverticulitis is characterized by the presence of diverticula plus infection or inflammation and is a sequel of diverticulosis.

(3) Diverticulitis and carcinoma of the sigmoid are often confused, but the differential diagnosis can usually be made by roentgen study.

(4) A so-called pre-diverticular stage is often seen and is characterized by spastic manifestations usually easily demonstrated by roentgen examination.

(5) Diverticula when present should always be reported to the referring physician or surgeon, with a description of their character, location and number. Many diverticula which are symptomless at the time of roentgen study may later produce very grave symptoms and even death.

(6) Roentgen study is our best means of diagnosing these conditions, but must be used with extreme care in studying the acute and subacute cases. The opaque meal should never be used in the acute or obstructive cases.

REFERENCES

1. Abbe, R. A.: A Case of Sigmoid Diverticulitis Simulating Malignancy, Demonstrated by Radiograph, Operation and Specimen. Med. Rec., **86**:190, 1914.
2. Carman, R. D.: The Roentgenologic Findings in Three Cases of Diverticulitis of the Large Bowel. Amer. Surg., **61**:343-348, 1915.
3. Case, J. T.: The Roentgen Study of Colonic Diverticula. Amer. Jour. Roentgenol. & Rad. Ther., **21**:207-220, 1929.
4. Enfield, Chas. D.: Diverticulitis of the Colon with Especial Attention to the Diagnosis. Radiology, **7**:371-378, 1926.
5. George, Arial W.; and Leonard, Ralph D.: The Value of the Roentgen Ray in the Study of Diverticulitis of the Colon. Amer. Jour. Roentgenol., **7**:421-431, 1930.
6. Kantor, Jno. L.: Roentgen Diagnosis of Diseases and Abnormalities of the Colon. Radiology, **19**:269-281, 1932.
7. LeWald, L. T.: Right-sided Diverticulitis and Diverticulosis. Radiology, **4**:43-48, 1925.
8. Rutledge, C. P.: The Diagnosis of Diverticula of the Colon. Tri-State Med. Jour., **1**:177-178, 1929.
9. Schiffer, Ernst: Diverticula of the Colon and Their Complications. Rontgenpraxis, **5**:865-877, Dec., 1933.
10. Spriggs, E. I.; and Marxer, O. A.: Multiple Diverticula of the Colon. Lancet, **1**:1067-1074, 1927.
11. Upson, W. O.; and MacGregor, A. D.: Roentgenological Aspect of Various Types of Colonic Diverticula. Radiology, **16**:30-38, 1931.

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DISCUSSION (*Abstract*)

Dr. R. K. McHenry, Houston, Tex.—It seems somewhat unusual to the modern roentgenologist that a period of some eighteen or nineteen years should have elapsed following the discovery of the x-ray before the condition known as diverticulosis was detected by this means. The larger percentage of cases in which this pathological condition exists, is diagnosed nowadays without effort in the routine procedures of the roentgen ray study of the gastro-intestinal tract. Because of the prevalence of saccular dilatations in the walls of certain segments of the colon and on account of the ease of detection, we as roentgenologists are prone to become callus to this deformity and call attention to the presence of these dilatations in an off-hand or matter-of-fact manner. The essayist in the short time allotted to him has surveyed the field comprehensively and in detail to remind us of the dangerous ramifications of this anomaly in the colon and to urge care and hard work that accurate information may be passed on for intelligent treatment.

There is in my opinion little to be added to the information conveyed by the essayist on this interesting subject, and I should like only to emphasize certain

points he has ably but briefly brought out. It is essential that a careful fluoroscopic examination be made of the colon, segment by segment, and that multiple film studies of suspected pathological segments be secured. I believe that the combined meal by mouth and opaque enema is the most efficient method and should be used routinely. Frequently an isolated study of the colon is requested. Formerly my routine procedure was the usual examination with the opaque enema and the contrast air follow-up. I feel now that for a more accurate study of the colon alone the opaque meal should be given by mouth and that 9 and 24-hour observations and longer should be made. This procedure may follow or precede the opaque enema study. It is the detection of the early inflammatory changes before irreparable damage to the wall of the gut occurs and which intelligent treatment may prevent that is of vital importance to the patient. There is nothing which will help us so much in our diagnostic efficiency as untiring hard work.

Dr. B. C. Garrett, Shreveport, La.—I wish to discuss Dr. Rutledge's paper from a surgical standpoint only. It may be interesting for us to recall that 3 or 4 per cent of all individuals suffer from diverticula and that the disease usually occurs between the fourth and fifth decade of life. It also may be interesting to note that about 30 per cent of cases of ulcerative colitis result in multiple polyposis or diverticulosis, and about 30 per cent of these result in cancer of the sigmoid. The diverticulum contains all the coats of the colon with the exception of the muscularis.

The etiology is not known, but it is believed not to be congenital and, as was said above, secondary to colitis. The condition usually occurs in obese people who as a rule suffer from constipation and therefore usually have increased pressure from within the gut. The diverticula usually occur at the point where the blood vessel enters into the gut, creating a weakness in the wall of the gut.

Many individuals have simple diverticulosis without symptoms. However, it is thought that any diverticulosis will eventually become infected and result in diverticulitis, for, as we know, the colon is full of germs and it is very easy for this pouch to become infected.

The two types of diverticulitis that we have to deal with are the simple inflammatory type and the obstructive type. The simple type reminds us very much of a left-hand appendicitis, a condition which we should always keep in mind, as it is associated with very much the same symptoms as appendicitis, namely, nausea, vomiting, pain, rigidity, elevation of temperature and increased leukocyte count. The obstructive type is the result of a diverticulitis or a cicatricial contraction of the tissue with obstruction of the sigmoid. This obstruction can be produced either from the inflammation or from the constricted tissue. These patients have very much the same symptoms as patients suffering from carcinoma of the sigmoid except that we find ulceration in the carcinoma and seldom, if ever, find it in diverticulitis. Sometimes a tumor mass can be palpated in the lower left side of the abdomen. In this type of individual we should always be on the lookout for a malignant condition.

The complications that may arise from a diverticulum are many, but the one we look for mostly is perforation which results in pelvic abscess or local or general peritonitis. Fortunately, peritonitis is usually local. Perforation may also occur in the adjacent gut or into the urinary bladder. It is estimated that 25 or 30 per cent of all cases of diverticulitis become obstructive. In diagnosing diverticulitis of the colon the history is very important. The patients complain of the ordinary symptoms of appendicitis and the laboratory findings are in keeping with appendicitis. The patient is usually over the ordinary age at which we expect appendicitis, that is, forty and above. It is sometimes very difficult to distinguish between ordinary diverticulitis and inflammatory carcinoma. This is hard to do sometimes even after the abdomen is opened and it does not make a great deal of difference, as the treatment is about the same. We should like to diagnoses the cases, however, from a prognostic standpoint. The proctoscope, x-ray and barium enema usually help us to secure a fairly definite idea of the condition.

If the patient knows he has diverticulitis he should be warned not to let his bowels become constipated, and in the event that he begins to show symptoms of an acute condition, he should call his physician immediately. Often if the patient is put to bed, solid food is stopped, and only liquid nourishment is given, with enemas, he will be tided over the attack. Sometimes the condition progresses and we have a localized abscess which should be drained and nothing further done at the time, as there is danger of general peritonitis. If general peritonitis occurs, the treatment should be conservative. If obstruction is present, we should do a colostomy approximate to the obstruction to relieve the condition temporarily and a few weeks later go back and resect the involved portion. This procedure will materially lower the death rate. It also gets rid of the diseased portion and if any malignancy is present it gets rid of that at the same time. In cases of diverticulitis the danger is general peritonitis and, as you know, the danger from carcinoma is metastasis.

ANTERIOR-PITUITARY DWARFISM*

FURTHER REPORT OF CASES TREATED WITH THE GROWTH HORMONE

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The growth hormone, derived from the anterior lobe of the pituitary gland, has been used in the laboratory to induce growth in pre-hypophysectomized animals, and recent clinical reports have been made of its apparently successful use in man.

This report represents fourteen cases of clinical pituitary dwarfism which have been observed during the past two and one-half years, and which have received the anterior-pituitary growth hormone† over variable periods during that time. Five of these cases have been pre-

*Read in Section on Pediatrics, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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†Antuitrin-G, the product used in this study, was supplied through the courtesy of Dr. Oliver Kamm, of the Research Laboratories of Parke, Davis & Co. It is not commercially available.

viously mentioned,[1] but, inasmuch as they are a part of this series, they are included in this report.

In 1871, Lorrain[2] described a case of infantilism, which was later recognized by Levi[3] (1908) as being associated with pituitary disease, because of the fact that this case had a pituitary neoplasm. We now recognize several types of dwarfism, but this discussion will be confined to the so-called Lorrain-Levi type, presumably due to anterior-pituitary secretory insufficiency. There have been careful clinical and autopsy studies of but few cases. Barker[4] gives a brief summary of four such studies reported by different authors. In all of them there was either a marked diminution of the adeno-hypophyseal tissue or a structural interference with its function.

The chief characteristics of the pituitary dwarf are statural underdevelopment and genital hypoplasia. The measurements are proportionate to those of a miniature adult, though there is frequently a lessening of the lower measurement. The primary sex characters are hypoplastic, though not always excessively so, and the secondary characters are absent, or greatly retarded. Overweight is rare. The facial features are small and delicate, and, later on, may assume a progeric appearance. Hair growth, except on the scalp, is entirely absent until late juvenility, and is then very scant. Mentally, there is rarely, if ever, retardation, and frequently, because of their diminutive size, pituitary dwarfs seem precocious. Likewise, because of their statural underdevelopment, parental coddling and sexual infantilism, their behavior reactions are sometimes immature.

The only consistently positive laboratory findings in this condition are those of the x-ray. Radiographic studies, as a rule, reveal a normal appearance and development of the osseous centers, with delayed epiphyseal closure. There may occasionally be some very slight retardation, due to secondary hypothyroidism. Changes in the size and contour of the sella turcica are sometimes visualized, but it must be remembered that the size of a gland is no criterion of its function.

In the diagnosis of true dwarfism associated with hypo-antuitarism, it is obviously important that all other endogenous and exogenous factors be eliminated. The multiplicity of these factors, and the almost unsurmountable difficulties in eliminating them, are appreciated. A knowledge of our present day conception concerning the effects of the pituitary, thyroid, parathyroid, adrenals and gonads on the organism, and their interrelationships, is a prime requisite toward accurate diagnosis. Fortunately, this type of hypo-antuitarism may be rather easily differentiated from hypothyroidism by the usual obesity, mental retardation, late dentition, and, especially, the markedly delayed appearance of the osseous centers in the latter condition. It must be borne in mind that a secondary thyroid deficiency may complicate some cases. Adrenal participation is usually evidenced by early maturity and closure of the epiphyses. In hypogonadism, the epiphyses remain open, and the increment is usually increased above normal. The lower measurements are greater than the upper.

Arrested development, due to parathyroid hypofunction, may manifest itself by so-called status hypoplasticus, with accompanying nervous and muscular irritability. The constitutional types associated with tuberculosis, syphilis, diabetes mellitus, hemolytic icterus, the anemias, and other disturbances of the hemopoietic system, should be readily ruled out. As iterated above, laboratory procedures, with the exception of the x-ray, are consistently negative. Lowering of the basal metabolic rate has been reported,[4 12] although, in this series, it is noticeably within normal limits.

Though one may be reasonably sure of the diagnosis, "When all is said and done, it must always remain in doubt, except in infrequent cases in which the hypophysis has actually been removed, or is known to have been destroyed, and this is verified by postmortem,"[12] or there has been a definite and continued response to the administration of the growth hormone.

The stimulating factor of somatic growth is now presumed to be elaborated by the eosinophilic cells of the anterior pituitary. Evans and Long,[5] in 1921, first reported the preparation of an extract of this gland, which produced giantism in normal rats and growth in hypophysectomized animals. Putnam, Teel and Benedict[6] and Evans *et al.*,[7] were able to produce symptoms of acromegaly in dogs by injecting alkaline extracts. Reichert[8] has demonstrated both the withdrawal and replacement effects of the growth hormone on this animal. The preparation of a sterile product, which retained its potency,[9] paved the way for clinical studies.

The first use of the growth hormone of the anterior hypophysis in the treatment of human pituitary dwarfism was reported by Engelbach[10]

in 1932. The results in this case were quite striking. Engelbach, Schaefer and Brosius[11] later reported seven additional cases, in which acceleration of growth took place. Barker[4] treated one case, but treatment was too short in duration to show any effect. Shelton, Cavanaugh and Evans[12] very completely presented four well controlled cases, in which the increment increased. Engelbach and Schaefer[13] give some additional cases and further data on those reported previously.[11] They conclude that, if the diagnosis is made sufficiently early, pituitary dwarfism is amenable to treatment.

CASE REPORTS

Case 1.—A female, aged 16 years 3 months, was the only child. The pregnancy was normal, and her birth weight was 6.75 pounds. She walked, talked and teethed at the normal age. Her stature had always been less than that of her playmates of the same years. At the age of 14 anterior-pituitary extract was prescribed by the family physician. She received 1 ampoule three times weekly, which produced severe headaches, and was discontinued after four months. No evident structural changes resulted from this therapy.

The maternal grandmother was smaller than the average, though the patient's mother and father were of normal height. I examined a maternal cousin of the patient, aged 20 years, who was of normal stature, with fully developed external genitalia, but who had a congenital atresia of the vagina.

This patient showed somatic and sexual underdevelopment of the Lorrain-Levi type. Her height was 53 inches (average 63.35 inches), and weight 78.25 pounds. The measurements were: upper, 27 inches; lower, 26 inches; half span, 27 inches. There was no evidence of any secondary sex characters. The breasts were quite masculine and no glandular tissue was palpable. Gynecological examination by Dr. J. B. Eskridge revealed greatly delayed development of the labia. The vagina was normal. There was apparent congenital absence of the uterus, ovaries, tubes and broad ligaments, but questionable presence of the cervico-coccygeal ligament, which apparently held the vaginal vault in place.

Laboratory.—The blood count showed 3,690,000 red cells and the hemoglobin was 70 per cent. The leukocyte count and differential were normal. The blood Wassermann was negative. Blood chemistry determinations were all within normal limits. The basal metabolic rates were plus 8 and plus 12. X-rays of the wrists and hip showed normal development. Skiagrams of skull and sella were also negative. The diagnosis was hypo-antuitarism, Lorrain-Levi type, with probable congenital absence of internal genital organs.

She was given alternating doses of theelin and anterior-pituitary-like hormone of pregnancy urine for a period of four months, during which time there was no change in her sexual development, and her height remained stationary. On July 1, 1932, anterior-pituitary growth hormone, starting with 0.5 c. c. daily was given in increasing doses until the patient was receiving 10 c. c. daily. This was injected deep in the gluteal muscles. Sometime later the dosage was reduced to 5 c. c. daily; then later to 5 c. c. every other day. She received anterior-pituitary growth hormone over a period of nineteen months and her height increased 1.75 inches (theoretical normal increment 0.37 inches), but there was no increase in genital development.

Case 2.—A male, aged 14 years 2 months, was an only child of normal parents. His birth weight was 7.75 pounds. The first tooth appeared at 8 months and he walked and talked at 15 months. His growth was about average until the age of 5 years. There had been a noticeable retardation in growth since that time. He had always been above the average in school and had presented no behavior problems. There was no family history of endocrine disturbance.

Examination showed evidence of definite structural underdevelopment. His height was 51 inches (average 61 inches), and weight 72 pounds. The measurements were: upper, 27 inches; lower, 24 inches; half span, 27 inches. The genitals were well developed, but there was no pubic nor axillary hair.

Laboratory.—Blood cytology, serology and chemistry were negative. The basal metabolic rate was plus 6. Roentgen studies of the wrists, elbow and shoulder revealed a slight retardation, but probably within normal limits. The skull was of normal thickness and contour and the sella turcica of average size. The diagnosis was hypo-antuitarism.

He was given daily intranasal insufflations of anterior-pituitary extract, 1 c. c., and thyroid in increasing doses up to 10 grains daily. This was continued over a period of 8 months, during which time he grew 3 inches. In July, 1932, the antuitrin was discontinued and anterior - pituitary growth hormone, 5 c. c. intramuscularly, was given daily for several months; then reduced to 5 c. c. every other day. The thyroid was continued at the same dosage. During seventeen months under this treatment he grew 6.2 inches (theoretical average 2.22 inches). In this period axillary and pubic hair appeared, and his genitals continued to develop normally. Although, clinically and roentgenologically, this case appeared to be typically one of anterior-pituitary growth deficiency, large doses of the growth hormone and thyroid over a period of seventeen months produced no greater relative increment than thyroid and plain antuitrin.

Case 3.—A male, aged 19 years 2 months, was the only child, and represented the only pregnancy. His birth weight was 7.5 pounds. The first tooth appeared at 10 months, and he walked and talked at 1 year. Infancy and early boyhood were uneventful except for his underheight. He had always been in the lower third of his classes at school, and graduated from high school at the age of 18 years. About two years previously he took thyroid, 10 grains daily, for a period of eight months, without increasing his weight. The father had *petit mal*. Both parents were of average height and weight. There was no history of ancestral endocrine disorders.

The patient was definitely undersize, but the musculature was well developed. His standing height was 59.75 inches (average 67.60 inches), and weight, 95 pounds. His measurements were: upper, 29 inches; lower, 30.75 inches; half span, 30.25 inches. He had a scant beard and sparse pubic hair. The genitals were of minimal average size for his age. There were no other pertinent findings.

Laboratory.—The blood cells and blood chemical findings were not pathological. The Wassermann was negative. The basal metabolic rate was minus 5. Roentgenograms of the extremities showed no osseous re-

tardation. The skull and sella turcica presented no abnormalities.

On September 9, 1932, anterior-pituitary growth hormone, 5 c. c. daily, was prescribed, and this dosage was continued without interruption until July 15, 1933. Though the epiphyses of the long bones remained open, no increased growth occurred. His height remained at 59.75 inches.

Case 4.—A male, aged 14 years 6 months, had a birth weight of 7.5 pounds. Dentition, walking and talking occurred during the first year. His growth progressed rather normally until about the age of four years. Since then it had been observed that he was slightly underheight. He was an excellent student in school, of genial disposition, and entered into all school activities.

There was structural underdevelopment of pituitary type. There was no obesity. The height was 58 inches (average 61.6 inches), and weight, 80 pounds. The measurements were: upper, 30 inches; lower, 28 inches; half span, 29 inches. The facial features were rather delicate. There was a moderate hypoplasia of the genitals.

Laboratory.—The blood count and urinalysis were normal. The Wassermann reaction was negative. The basal metabolic rate was plus 11. X-rays of the wrists and knees showed no retardation in osseous development. There were no unusual changes in the skull nor sella turcica.

Beginning September 9, 1932, anterior-pituitary-like sex hormone, 1 c. c., was given every other day for a period of four months, during which time there was no somatic growth, but his genitals increased in size and pubic hair appeared. Another series of x-rays was made, which showed no changes in the epiphyses. Anterior-pituitary growth hormone, 3 c. c. daily, was then given, and continued for thirteen months, during which time he grew 3.5 inches in height (theoretical average increment 1.73 inches). His genitals developed to approximately normal and there was an abundance of pubic hair, of feminine type. He had never taken thyroid.

Case 5.—A male, aged 12 years 9 months, had been delivered as a difficult breech presentation. He was a very large baby, weighing 13 pounds at birth. Dentition occurred at 6 months, and he walked and talked during the first year. His growth was apparently average until the fifth year. Since then he had grown very little, as evidenced by his present height. A very accurate check of his growth by his mother revealed an increase of only 0.25 inch in height during the preceding year. He made excellent grades in school, and played the piano quite well.

The boy was a well proportioned dwarf. His height was 43.75 inches (average 53.45 inches), and weight, 40 pounds. The measurements were: upper, 22.5 inches; lower, 21.25 inches; half span, 21.5 inches; circumference of head, 21.5 inches; circumference of chest, 21.5 inches; and abdomen, 20 inches. The facial features were rather sharp. The genitals were infantile.

Laboratory.—The erythrocyte count was 3,700,000 and the hemoglobin was 66 per cent. The leukocytes numbered 7,000, and the differential revealed 7 per cent eosinophils. The Wassermann reaction was negative, and the urinalysis revealed no abnormal constituents. Basal metabolic rate and blood chemical determinations were not done. Roentgen studies of the wrists revealed approximately four years' retardation in appearance of osseous centers. The skull and chest were negative.

Clinically, this boy presented signs of pituitary dwarfism, but, because of the definite osseous retardation, he was given thyroid in increasing dosage to tolerance, which was established at only 2 grains daily. This was continued for four months, during which time there was no increment. Anterior-pituitary growth hormone, 3 c. c. every other day, was then given over a period of 7 months, with an increase of only 0.25 inch in height (theoretical average increment 1.05 inches).

Case 6.—A male, aged 6 years 11 months, represented the first pregnancy of normal parents. The birth weight was 8 pounds, and he was jaundiced until the age of 2 months. The first tooth appeared at 10 months. He talked at 13 months and walked at 15 months. The mother stated that he had grown very slowly since 6 months of age. He started to school the preceding year, and was doing good work. He was very easily controlled and there was no apparent mental retardation. He had a brother, 13 months his junior, who was 10 inches taller.

This boy showed somatic undergrowth with proportional measurements. There was an internal squint of the left eye. A moderate degree of girdle adiposity was present, though he would not be considered obese. The genitals were infantile.

Laboratory.—Examinations, including blood cell counts, Wassermann reaction and blood chemical determination, were negative. X-rays of the wrists revealed four carpal centers present, a retardation of approximately three years. Roentgenographic studies of the skull and sella turcica revealed nothing remarkable.

He was given thyroid, 1 grain daily, which was increased the second week to 2 grains daily. Signs of thyroid intoxication developed. His tolerance was established at 1 grain daily, which was continued over a period of 6 months, during which time the increased growth measured 1.12 inches (theoretical normal increment 1.01 inches). Anterior-pituitary growth hormone, 3 c. c. every other day, was then added, and, during the next 6 months, the increment was 0.75 inch (theoretical normal 1.00 inches). In this particular case, it seemed evident the growth hormone was not effective, and was possibly antagonistic.

Case 7.—A male, aged 11 years 7 months, had a birth weight of 10 pounds. He teethed, walked and talked during the first year. He had always been rather plump, but had gained more rapidly during the past two years, especially about the shoulder and pelvic girdles. Headaches appeared three years before, but had been relieved by corrective lenses. He had always been slightly underheight and school records revealed that he had grown only 0.5 inch in the past year. His school work was above the average, and he showed no unusual personality traits.

There was very moderate structural underdevelopment. The height was 54 inches (average 56.35 inches), and weight, 80 pounds, which were within normal limits for the age. There was some increased deposition of fat over the breasts, abdomen and mons veneris and mild genital hypoplasia. Ophthalmoscopic examination revealed apparent physiological cupping of the discs. Perimetric examination revealed no restriction of the visual fields. The measurements were: upper, 27.6 inches; lower, 26.4 inches; half span, 26.8 inches.

Laboratory.—The blood count and urinalysis were normal. The Wassermann reaction was negative. The basal metabolic rate was minus 7. Roentgenograms of

the skull, wrists and knee joints revealed normal to slightly advanced osseous development.

He was given anterior-pituitary-like sex hormone, 1 c. c. every other day, for ten doses each month, for a period of 9 months, during which time he grew 2 inches in height (theoretical average 1.35 inches), and there was a definite increase in the size of the genitalia. The sex hormone was then discontinued and anterior-pituitary growth hormone, 3 c. c. every other day, was given during the following 10 months, with an increment of 1.5 inches (theoretical average 1.5 inches). This case was interesting because the increase in height was greater during the time of treatment with sex hormone than over a longer period under growth hormone administration.

Case 8.—A male, aged 13 years, was the fourth and last child. He had two sisters and one brother of average stature and weight. His birth weight was 7.5 pounds and he weighed 5 pounds at 8 weeks. The first tooth appeared at 12 months, but there were no further eruptions until the eighteenth month. Dentition was fairly normal after that. He walked and talked at 14 months. He was of average height and weight at 18 months, but had been undersize since then. According to the school records, he had not grown at all during the previous sixteen months. There was no mental retardation. Father and mother, brother and sisters were all of average height and weight. He had a paternal cousin, aged 29 years, who was less than 4 feet tall, and another 21 years of age, whose height was less than 5 feet.

This patient was slightly below the average minimal in structural development. His height was 55.75 inches (average 58.9 inches), and weight, 77 pounds. The measurements were: upper, 27 inches; lower, 28.75 inches; half span, 28.5 inches. He had the general appearance of a well developed and well proportioned boy. The external genitals were moderately developed for his age.

Laboratory.—The blood count and urinalysis were normal. The blood Wassermann reaction was negative. The basal metabolic rate was minus 3. Roentgenograms of the long bones revealed an apparent slight retardation of growth. Stereoroentgenograms of the skull and sella turcica revealed no abnormalities.

Anterior-pituitary growth hormone, 3 c. c. daily, was prescribed. During the first 3 months of treatment he grew 1.75 inches. Continued medication during the next five months resulted in no further increment. It appeared in this case that growth hormone was definitely effective in stimulating growth over a three-month period, but was ineffective thereafter.

Case 9.—A female, aged 15 years and 4 months, was a normal, full-term baby, who had her first tooth at 9 months. She walked and talked at 13 months. Her statural development was apparently normal until the age of 9 years, but she had grown very little since then. There was no mental retardation. She had not matured.

The patient's general somatic development was definitely retarded, though proportional. Her height was 50 inches (average 62.27 inches), and weight, 74 pounds. The upper, lower and half span measurements were 25 inches, respectively. There was no obesity. The extremities were quite acrocyanotic. The skin and hair were of normal texture. There was slight hypertrichosis of the forearms. No breast development was evidenced. There were a few scattered hairs over the mons veneris.

Laboratory.—The blood count, Wassermann reaction and chemical examinations, including serum calcium and phosphorus determinations, were all within normal limits. The urinalysis was negative. The basal metabolic rate was plus 9. Roentgenograms of the wrists, shoulder and knee revealed normal osseous progress. Those of the skull and sella turcica revealed no evidence of pathology.

She received growth hormone, 3 c. c. subcutaneously, every other day over a period of three months, and her height increased 1.3 inches (theoretical normal increment 0.15 inches).

SUMMARY

Fourteen cases of apparent endocrine dwarfism have been observed during the past two and one-half years, and treated with anterior-pituitary growth hormone, over periods varying from 3 to 19 months. Nine of these, considered as being due to a deficiency of the anterior-pituitary growth hormone, have been reported in detail, but five are not included in this series for the following reasons: four had not been on treatment for a sufficient length of time, or had not cooperated properly, and the other was, presumably, a case of status hypoplasticus. In five (*Cases 1, 2, 4, 8, and 9*) of the reported cases (*Table 1*) increased growth was evidenced, and was greater than the theoretical average increment for the period. In two of the four showing no increment the osseous development was normal for the age, and the others were retarded three and four years, respectively. In none of these cases was there any evidence of epiphyseal disease. Roentgenograms, made before and after treatment, revealed no pertinent osseous changes. In one pa-

Case No.	Sex	Age		B.M.R.	Osseous Development	Ht. ins.	Ave. normal Ht.	~ Control Period			Treatment			Ave. normal increment
		YRS.	MO.					MO.	Growth	Ave. nor. growth	Ant. G.	MO.	Growth ins.	
1	F	16	3	+10	normal	53	63.35	4	0	0.18	10 C.C. DAILY 5 C.C. DAILY 5 C.C. Q 2 DA.	19	1.75	0.37
2	M	14	2	+6	slight retardation	51	61.0	8	3	1.13	5 C.C. DAILY 5 C.C. Q 2 DA.	17	6.2	2.22
3	M	19	2	-5	normal	59½	67.6	20	0	1.55	5 C.C. DAILY	10	0	0
4	M	14	6	+11	normal	58	61.6	4	0	0.53	3 C.C. DAILY	13	3.5	1.73
5	M	12	9		4 yr. retardation	43½	58.45	12	0.25	1.80	3 C.C. DAILY	7	0.25	1.05
6	M	6	11		3 yr. retardation	38	47.01	6	1.11	1.01	3 C.C. Q 2 DA.	6	0.75	1.00
7	M	11	7	-7	normal +	54	56.35	9	2	1.35	3 C.C. Q 2 DA.	10	1.5	1.5
8	M	13	0	-3	normal	55½	58.9	16	0	2.4	3 C.C. DAILY	8	1.75	1.1
9	F	15	4	+9	normal	50	62.77	9	0.5	0.48	3 C.C. Q 2 DA.	3	1.5	0.15

Table 1

tient (*Case 8*), who received daily injections over a period of eight months, the total increment was made during the first three months of treatment. Continued medication during the next five months resulted in no further growth. This would seem to indicate that a physiological resistance to further stimulation had been established. The same explanation may apply to *Case 6*, in which there was an increment of 1.12 inches during a six-months period of thyroid therapy, but only 0.75-inch increment with combined thyroid and anterior-pituitary growth hormone over a corresponding period. The growth in *Case 2* was approximately as marked on thyroid and antuitrin (plain) as on thyroid and growth hormone.

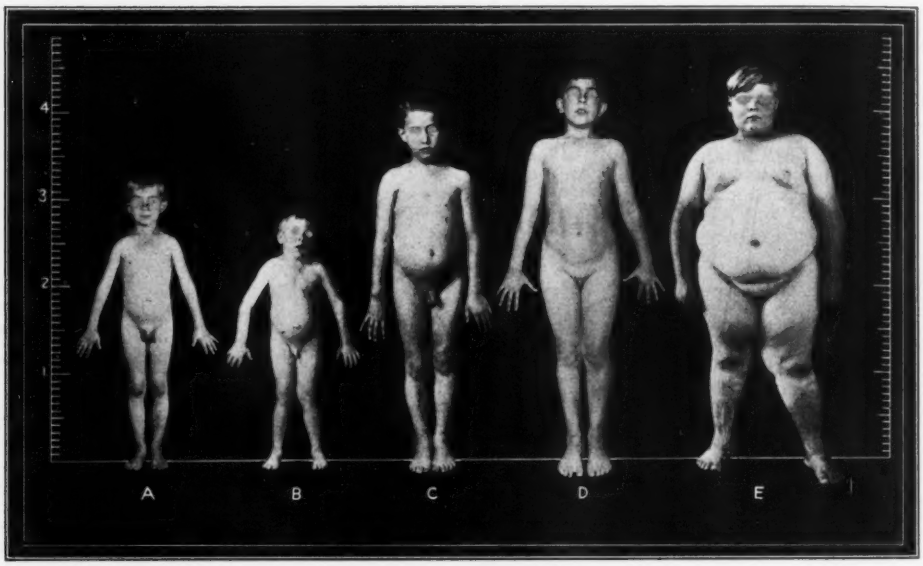

Fig. 1

Hypo-antuitarism (A), aged 9 years, compared with normal (C) and other endocrinopathies of same age: hypothyroidism (B); hypogonadism (D); and neurohypophyseal, or adiposogenitalism (E).

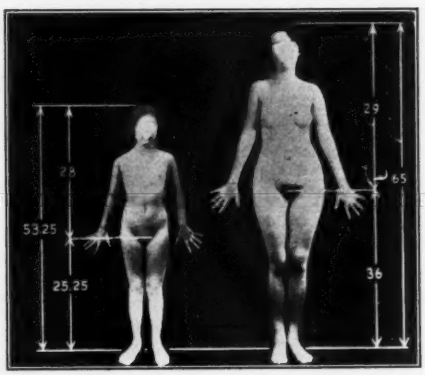

Fig. 2

Hypo-antuitarism (left), aged 16 years, compared with hyper-antuitarism, aged 10 years. Contrast dwarfism and agenitalism with statural and genital overdevelopment of the latter.

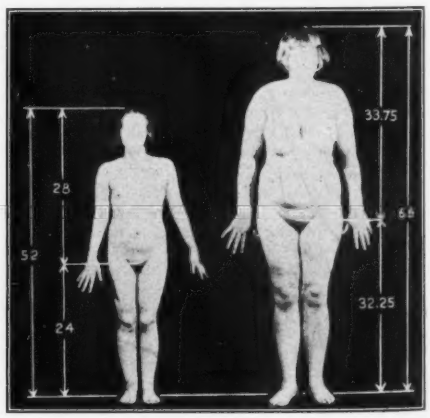

Fig. 3

Hypo-antuitarism (left), aged 20 years, compared with adiposogenitalism, aged 13 years.

Collip[14] has reported that hypophysectomized rats, when treated for several weeks with his purified growth extract, ceased to grow, and even showed a decline in the growth curve. He suggests that this was due to some inhibitory mechanism, brought into action by continued stimulation with the hormone which produces increased resistance or actual non-responsiveness. This he considers the action of an anti-hormone.

Case 1 was a typical Lorrain-Levi type of hypo-antuitarism, and received a total of 1,650 c. c. of growth hormone over a period of 19 months, with an increment of 1.75 inches (theoretical average normal 0.37 inches). It is pertinent to note that careful gynecological examination, under anesthesia, revealed an apparently congenital absence of the uterus, tubes, ovaries, and broad ligaments. It is also interesting to note that this patient's cousin had a congenital atresia of the vagina.

Because of the fact that approximately three-fourths of the total body increment has been reached by the ninth year, and that, normally, the period of greatest growth occurs before gonadal development has proceeded to any great extent, this would seem the period of greatest response to the growth hormone.[15] Actually, however, a summary of all cases so far reported in the literature reveals a greater increment in patients above this age (9 years) on, comparatively, the same amount of treatment over an equal period of time.

In some individuals there is a natural tendency for growth to occur in spurts, and this must be considered in a study of this sort. However, in the majority of the patients in this series the growth was so much greater during the time of treatment than during the control period that I feel sure it was more than a mere coincidence.

CONCLUSIONS

(1) The growth hormone is evidently potent in stimulating growth in certain selected cases of endocrine dwarfism.

(2) In its present potency the frequent administration of the necessarily large doses militates against its general clinical use.

(3) There is a possibility of the establishment of a physiological resistance, or anti-hormone response, from continued administration of this hormone.

REFERENCES

1. Turner, Henry H.: The Growth Hormone. Proceedings of the American Therapeutic Society, 1934, in press.
2 and 3. Quoted by Engelbach, Wm.: Endocrine Medicine. Springfield, Ill.: Charles C. Thomas Co., 1932.
4. Barker, L. F.: A Case of Hypophyseal Dwarfism (Nanosomia Pituitaria) Probably Due to Cyst or Benign Neoplasm Originating in Residues of the Ductus Craniopharyngeus: Discussion of the Probable Functions of the Different Types of Cells of the Adenohypophysis. Endocrinology, **17**:647, Nov.-Dec., 1933.
5. Evans, H. M.; and Long, J. A.: The Effect of Anterior Lobe Administered Intraperitoneally upon Growth, Maturity, and Estrous Cycles of the Rat. Anat. Record, **21**:26, 1921.
6. Putnam, T. J.; Teel, H. M.; and Benedict, E. B.: The Preparation of a Sterile Active Extract from Anterior Lobe of the Hypophysis. Amer. Jour. Physiol., **84**:157, 1928. Studies in Acromegaly. VIII. Experimental Canine Acromegaly Produced by Injection of Anterior Lobe Pituitary Extract. Arch. Surg., **18**:1708, April, 1929.
7. Evans, H. M.; Meyer, Karl; and Simpson, M. E.: The Growth and Gonad-Stimulating Hormones of the Anterior Hypophysis Memoirs Univ. Calif., **11**:425, 1933.
8. Reichert, F. L.: The Results of Replacement Therapy in an Hypophysectomized Puppy: Four Months of Treatment with Daily Pituitary Heterotransplants. Endocrinology, **12**:451, 1928.
9. Bugbee, E. P.; Simond, A. E.; and Grimes, H. M. Anterior Pituitary Hormones. Endocrinology, **15**:41, 1931.
10. Engelbach, Wm.: The Growth Hormone. Endocrinology, **16**:1, Jan.-Feb., 1932.
11. Engelbach, Wm.; Schaefer, R. L.; and Brosius, W. L.: Endocrine Growth Deficiencies. Endocrinology, **17**:250, May-June, 1933.
12. Shelton, E. K.; Cavanaugh, L. A.; and Evans, H. M.: Hypophyseal Infantilism. Amer. Jour. Dis. Child., **47**:719, 1934.
13. Engelbach, Wm.; and Schaefer, R. L.: Endocrine Dwarfism. Endocrinology, **18**:387, May-June 1934.
14. Collip, J. B.: Some Recent Advances in the Physiology of the Anterior-Pituitary. Jour. Mt. Sinai Hosp., **1**:28, May-June, 1934.
15. Turner, Henry H.: The AnteriorPituitary Growth and Sex Hormones. Jour. Ark. Med. Soc., **30**:1, June, 1933.

1200 North Walker Street

DISCUSSION (*Abstract*)

Dr. Daniel L. Sexton, St. Louis, Mo.—That there is a specific growth hormone is a certainty, as has been repeatedly shown by the work of Evans on rats and dogs and by Putnam, Benedict and Teel in their studies on dogs. To find a place in clinical medicine for this hormone in its present form, however, is indeed difficult, for, as Dr. Turner has told us, one of his patients received 1,650 c. c. of growth hormone over a period of nineteen months. Experimental results and clinical results are two entirely different matters in endocrine therapy, and while clinicians must have the backing of laboratory proof, they cannot hope to obtain the same results with patients that can be demonstrated on animals.

With the splendid work which is being carried on in the many laboratories over the entire world, advances of practical value are certain to develop in endocrine therapy. In my own limited experience with anterior-pituitary growth hormone results have been disappointing. Clinical reports such as Dr. Turner has given us will do much to advance endocrine therapy. Our efforts must be useless if we attempt to bring about results through oral therapy except with desiccated thyroid.

Dr. Turner (closing).—The majority of the cases presented here today were treated with the growth hormone only. This, of course, was done as a clinical experiment for the purpose of determining its effect without the aid of other growth stimulating factors. Thyrotropic and adrenotropic substances are present in the anterior-pituitary, and I believe are definitely concerned in normal somatic development. In the general treat-

ment of endocrine dwarfism all these should, perhaps, be used at some time. Whether the cessation of growth in some of my patients was similar to that observed at times in normal individuals, or whether it was due to an anti-hormone response, such as was recently described by Collip, I do not know.

It is apparent that the growth hormone is effective in stimulating growth in some cases of dwarfism, although there are certainly many other factors which must be considered. The time elapsed since the isolation of these newer principles of the anterior-pituitary is too short, and clinical experimentation insufficient, to warrant final deductions.

HEMOLYTIC ICTERUS WITH INFANTILISM*

By WANN LANGSTON, M.D., F.A.C.P.†
Oklahoma City, Oklahoma

The following case has provided an interesting clinical study of a combination sufficiently uncommon to justify bringing it before the Association.

CASE REPORT

E. H. A., a white male of 18 years, entered my service January 4, 1932. Eleven years previous to admission, at the age of 7, he had an acute illness characterized by nervousness, extreme weakness, nausea, abdominal pain and jaundice, and a mass was noticed in the upper left abdominal quadrant. He was confined to bed for about three months The jaundice and abdominal mass have persisted to the present time, the jaundice showing remissions and exacerbations. Each spring up to two years ago he had severe attacks similar to the first, each lasting about one month, and presenting the same train of symptoms, with deepening jaundice and aggravation of the upper abdominal pain. He has had a voracious appetite, has been constipated, sleeps poorly, has urinary frequency and nocturia.

A small child from birth, he developed normally up to the age of 7, when growth became retarded, and development ceased almost entirely at the age of 11. There has been no retardation of mental development, although his progress in school has been slow on account of his inability to attend regularly.

The past history other than recited above is unimportant. The family history is entirely irrelevant. Careful inquiry has revealed no familial tendency to icterus or to mal-development in any branch of the family.

Examination.—A white boy, 59½ inches in height weighing 89½ pounds, with prognathous facies, is moderately anemic and jaundiced. Stature and development can be judged best from the plates. Note also posture facies, musculature and infantile genitalia.

Except as noted above, the scalp, eyes, ears, nose and throat are negative. The anterior and posterior cervical lymph nodes are enlarged. The thyroid is not palpable The lungs are negative. The heart is negative except for a soft systolic basal murmur and slight bradycardia.

Examination of the abdomen reveals a large notched tumor mass in the left upper abdominal quadrant, obviously the spleen. The liver edge is just palpable below the costal margin.

The genitalia are infantile, as may be seen from the plates. There is no pubic hair, no hair on the body, in the axillae nor on the face.

Examination of the nervous system is entirely negative.

Detailed laboratory examination before splenectomy is shown in *Table 1.* The blood picture is composite from several examinations.

Table 1

Hemoglobin	50 to 56 per cent
Red blood cells	3,250,000 to 3,860,000
Reticulocytes	15.3 to 18.8 per cent
White blood cells	6,100 to 8,200
Neutrophils	60 to 76 per cent
Eosinophils	0 to 4 per cent
Lymphocytes	24 to 36 per cent
Thrombocytes	280,000
Coagulation time	5 to 8 minutes
Bleeding time	3 minutes
Clot retraction	Normal
Fragility of red cells	Begins at 0.50 per cent; complete at 0.40 per cent.
Control	Begins at 0.40 per cent; complete at 0.34 per cent
Blood chemistry:	
N. P. N.	48 mg. per cent
Cholesterol	159 mg. per cent
Serum calcium	12 mg. per cent
Glucose tolerance	91 mg.; 150 mg.; 136 mg.
Icteric index	20 to 35 units
Van den Bergh:	
Direct	No reaction
Indirect	5 to 14 units, 2.5 mg. to 7.0 mg.

The basal metabolism is plus 14.5.

The urine is negative except for bile pigment and urobilinogen.

Radiography.—The entire skeleton was x-rayed and the radiologist reported as follows:

Skull.—No evidence of pathology of the sella. Suggestion of calcium deposit in the pineal gland.

Long Bones.—Epiphyses are those of a 12 to 14-year-old child. Some lack of calcium in the bones.

Gallbladder.—No dye in the gallbladder after intravenous administration of the dye.

Figs. 5 to *7* show the appearance of the epiphyses and the rarefaction of the bones.

The diagnosis is hemolytic ictero-anemia with infantilism (Lorrain-Levi type.)

Splenectomy was recommended.

Dr. R. M. Howard, of the Surgical Service, was called in consultation, concurred in the diagnosis, and accepted the patient for operation. This was performed March 7, 1932. The spleen weighed 1,080 grams. The following statement from the pathologist's report is of interest: "The red cells in the pulp appear large and swollen, * * * but there is an occasional sinusoid which contains red cells that are small, contracted, very irregular in size and shape."

The postoperative course was uneventful. The response of the blood picture was characteristic. Within a week the hemoglobin was 75 per cent, the red count 5,000,000; the reticulocyte count had dropped to 9.4 per cent, the icteric index to 8.5, and the van den Bergh

*Read in Section on Pathology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

†Professor of Clinical Medicine, University of Oklahoma School of Medicine.

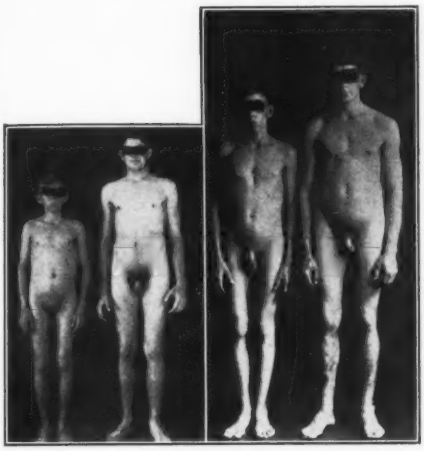

Fig. 1

The patient (left) with a normal young man of the same age (right), before (left) and two years after treatment was begun (right).

was negative. Two weeks after opration the reticulocyte count was 0.86 per cent; the red count was 5,500,000, and a little later reached 5,820,000. The fragility of the red cells on repeated examinations remained almost identical with the original figure.

The patient was dismissed April 3, 1932, in excellent condition. The blood picture has been followed at frequent intervals, and *Table 2* shows the condition of the blood on July 17, 1934.

Table 2

Hemoglobin, Sahli	110 per cent
Red blood cells	5,060,000
Bleeding time	2 minutes
Coagulation time	2 minutes
Platelets	212,520
Reticulocytes	1.2 per cent
White blood cells	10,000
Neutrophils	52 per cent
Eosinophils	14 per cent
Basophils	2 per cent
Lymphocytes	31 per cent
Transitional	1 per cent
Icterus index	9
Van den Bergh—indirect and direct	No reaction
Fragility	
Beginning hemolysis	0.48 per cent
Complete	0.32 per cent

There is but one other point relative to the hemolytic ictero-anemia to which I wish to call attention in this report, namely, the relative lack of calcium in the bones as revealed by the x-ray, a condition which has been reported by a number of observers[1 2 3 4] in connection with the chronic hemolytic anemias, hemolytic ictero-anemia, sickle cell anemia, and the hemolytic anemia of the Mediterranean area. I have observed this phenomenon in sickle cell anemia. In all of my cases the serum calcium has been normal, or so slightly elevated as to be negligible.

Now I shall discuss briefly the phase of this case which has made it one of extreme interest, namely, the genital and skeletal infantilism complicating the hemolytic ictero-anemia. It has been noted above that the development, both of the skeleton and of the genitalia, had been arrested at about the age of 11, and that now, at the age of 18 the patient presents the appearance of a 12 or 13-year-old boy.

Developmental anomalies associated with hemolytic anemia are not unknown. Gansslen[5]

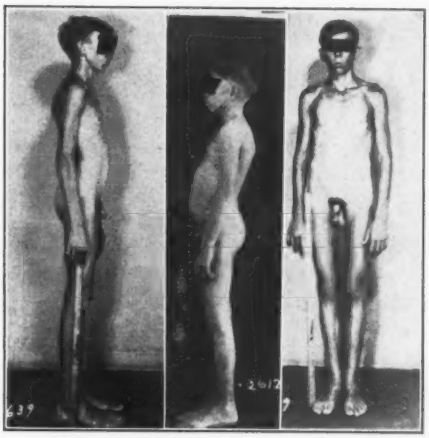

Fig. 2

The patient before and after treatment. To scale.

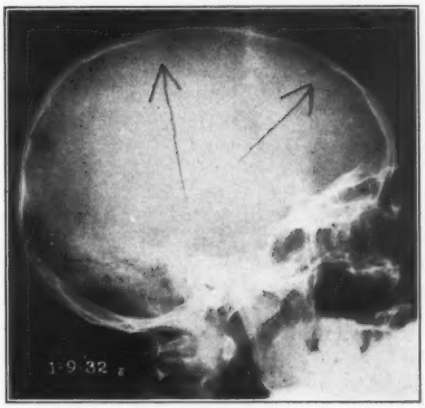

Fig. 3

The skull, showing characteristic appearance of hemolytic ictero-anemia.

Fig. 4
The long bones. Note the open epiphyses and the relative lack of calcium.

says: "The condition is frequently accompanied by other constitutional anomalies." He mentions skeletal abnormalities, such as pointed skull, narrow forehead, negroid type of nose, prognathism, bradydactylia and polydactylia, deformities of the ears, abnormalities of the skin, anomalous distribution of the hair, etc. To quote:

"In a large number of cases an underdevelopment, or at least a hypofunction of the glands of internal secretion, is present; cases of infantilism with a peculiar childish psychic behavior and hypogenitalism with an incomplete development of the secondary sex characteristics are observed."

He questions whether such are primary, or are secondary disturbances, "conditioned by the hemolytic affection."

Gansslen apparently, however, has reported no specific case, and F. Parkes Weber,[6] referring to this, calls attention to his case, first reported in 1914 under the heading of "A Familial Case of Splenomegalic Anemia with Infantilism,"[7] and sets out his reasons for changing his opinion as to the causation of the patient's illness. He discovered after the patient's death that the father and mother, and at least several of the 13 children had positive Wassermann reactions, and states that his patient's "whole illness may have been the result of congenital syphilis," and that "at all events it cannot be maintained that the case was an example of infantilism due to congenital hemolytic jaundice or anemia."

Gaudier[8] reports one case, a male of 20 years, jaundiced since birth, "of medium build, but infantile aspect; the genital development was below normal, pubescence was not marked in axillary and pubic regions; the thorax was elongated, limbs slight, the musculature deficient; the appearance was that of a slightly anemic adolescent of 15 or 16 years."

Splenectomy was done and "the result clinically and biologically was remarkable." Gaudier does not state whether the infantilism was corrected, the above quotation applying only to the jaundice and anemia. I have been unable to get a follow-up report on this case.

Although I have communciated with the Surgeon General's Library, I have been unable to find in the literature reports or references to reports of other specific cases of infantilism complicating hemolytic jaundice. However, in view of Gansslen's statement, and the reports of Weber and Gaudier, and the fact that in the present case arrested development was coincident with the onset of the hemolytic ictero-anemia (acquired?), I feel that one is justified in assuming a relationship between the two. This, of course, in the present case is impossible of proof.

When it was observed that the "epiphyses are those of a 12 to 14-year-old child,"* it appeared that some stimulation of growth might be expected after the assumed cause of the mal-development was corrected, namely, the hemolytic ictero-anemia. After the successful removal of the spleen, and the prompt response outlined above had been achieved, two courses seemed open. First, the patient might be left alone for a period to determine whether spontaneous

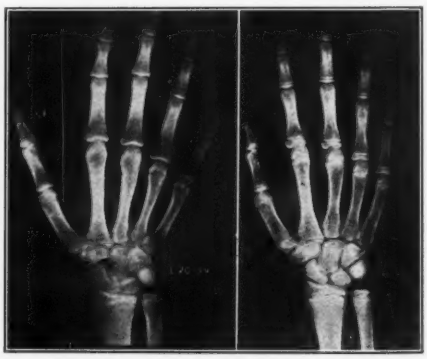

Fig. 5
Comparison of the bones of the hand of the patient (right) with that of a normal young man of the same age (left). There was no change in the bones of the hand after treatment.

*From the roentgenologist's report.

development would occur. This would have been an extremely interesting observation to make, the experiment would have been more scientific, and the information obtained more definite than would be possible with the second alternative. On the other hand, should rapid closure of the epiphyses occur, or should we lose contact with the patient (as was probable), opportunity to make the second observation would be lost. Consequently, I determined to adopt the second course, which was to administer growth hormone and sex hormone immediately.

On April 5, 1932, this therapy was begun, the patient receiving one c. c. intramuscularly of antuitrin on alternate days until twenty ampoules had been taken. In June of the same year he was supplied with 20 c. c. of anterior-pituitary growth hormone and 20 of anterior-pituitary-like sex hormone from pregnancy urine to be taken on alternate days. During 1933 he received only 10 c. c. of each. In the spring of 1934 he was supplied with 20 c. c. of each through the generosity of Parke, Davis & Co., a portion of which was not used. Thus from April, 1932, to July, 1934, this boy had received 60 c. c. of the growth hormone and 40 c. c. of the sex hormone.

By October, 1932, he reported development of the genitalia and the appearance for the first time of pubic hairs, as well as a two-inch increase in height. This development continued until by July, 1934, he had attained the normal height for the male members of his family, his father and an older brother, and the genitalia were approximately normal. *Table 3* and photographs show the results much more satisfactorily than I can describe them.

Table 3

HEIGHT-WEIGHT CHART

Date	Height in Inches	Weight in Pounds
February 29, 1932	60	87
May 3, 1932	60¼	94
June 5, 1932	61	94
September 6, 1932	61 1/3	88
March 11, 1933	62½	93
May 14, 1933	64	90
September 19, 1933	64¾	100
July 17, 1934	66½	112

At the present time this young man is apparently a normal individual. For about two years he has been working; at this time he is a truck driver for a laundry. Not only is he normal from a physiological standpoint, but there has also been a marked change in him psychologically. Formerly he was extremely sensitive about his condition; today this has disappeared.

Recent x-ray studies, however, reveal little if any change in the epiphyses or in the osteoporosis. Hormone therapy has been discontinued. The patient will be observed further for continued growth and for changes in the bones.

SUMMARY

(1) A case of hemolytic ictero-anemia associated with skeletal and genital infantilism is presented. As far as can be determined from the history the onset of the two conditions was simultaneous. Hence, a causal relationship of the ictero-anemia to the infantilism is suggested.

(2) The hemolytic ictero-anemia was relieved by splenectomy, with characteristic response.

(3) Following recovery from the operation hormone therapy (growth and sex) was instituted.

(4) Twenty-seven months after this therapy had been instituted normal height (for his family), and normal genital development had been attained. The increase in height in this period of time was six and one-half inches.

(5) X-ray studies suggest that closure of the epiphyses is progressing slowly, if at all, and further increase in height may be expected.

(6) This young man's general health is now excellent, and he is able to carry on the work of a normal individual.

REFERENCES

1. Friedman, Levis J.: Osseous Changes in Hemolytic Icterus. Amer. Jour. Roentgenol. & Rad. Ther., **20**:440, 1928.
2. Feingold, Benjamin F.; and Case, James T.: Roentgenologic Skull Changes in the Anemias of Childhood. Amer. Jour. Roentgenol. & Rad. Ther., **29**:194, 1933.
3. Wade, R. B.; and Steigrad, J.: Splenomegalic Jaundice with Associated Changes in the Skull. Med. Jour. Australia, **2**:530, 1928.
4. Cooley, T. B.; Witwer, E. R.; and Lee, Pearl: Anemia in Children with Splenomegaly and Peculiar Changes in the Bones: Report of Cases. Amer. Jour. Dis. Child., **34**:347, 1927.
5. Gansslen, M.; Zipperlen, E.; and Schuez, E.: The Hemolytic Constitution. Deutches Archiv. fur Klinische Medizin, **146**:1, 1924.
6. Weber, F. P.: The Question of Infantilism as a Complication of Congenital Hemolytic (Acholuric) Jaundice or Anemia. Brit. Jour. Child. Dis., **23**:185, 1926.
7. Weber, F. P.: A Familial Case of Splenomegalic Anemia with Infantilism. Brit. Jour. Child. Dis., **11**:345, 1914.
8. Gaudier, H.; and Gernez, C. H.: A Case of Congenital Hemolytic Jaundice Treated and Cured by Splenectomy. Bulletins et Memoires de la Societe Nationale de Cherurgie, **55**:374, 1929.

DISCUSSION (*Abstract*)

Dr. Roy R. Kracke, Emory University, Ga.—The case reported of hemolytic icterus combined with infantilism may be of more importance than we realize at this time. The coincidence of these two conditions offers opportunity for considerable speculation as to their relationship.

According to recent work in hematology, hemolytic icterus has for its pathological basis a distortion and underdevelopment of the red blood cells which renders them more liable to the normal process of destruction. In this condition the red cell is not only somewhat microcytic, but instead of being a flat, biconcave disc, is much thicker than normal and, therefore, tends to be somewhat spherical in its dimensions. It would appear possible, then, that this condition could come about through underdevelopment of bone marrow function, associated with an underdevelopment or a malfunction of many of the glandular structures, resulting in infantilism.

These cases are not so rare as the American literature

would indicate since, according to Naegeli, this combination is frequently reported in the European literature.

The author treated his case by splenectomy and administration of glandular extracts with good results. This, no doubt, was the correct procedure to follow, although, unfortunately, it will never be known which therapeutic procedure accomplished the desired results. It might have been far better from a standpoint of clinical research had splenectomy been carried out without the other therapy, or had administration of glandular products been used without splenectomy. Under this plan at least more light could have been thrown upon the relationship of the two conditions.

Dr. Langston (closing).—This patient will be kept under observation, and I hope to make a future supplementary report.

DECOMPRESSION OF FEMORAL VESSELS TOGETHER WITH KONDOLEON OPERATION FOR CONGENITAL ELEPHANTIASIS IN A CHILD*

REPORT OF A CASE

By BERTRAM M. BERNHEIM, M.D., F.A.C.S.,
Baltimore, Maryland

On August 27, 1931, I first saw a boy (E. K.), aged 3, whose mother gave the following history:

When the child was six months old the mother began to notice that his left leg was somewhat blue and swollen. She said the leg may have been larger from birth, but she was not sure. She only became sure of it when he was six months old, at which time she mentioned it to her physician. He thought it was a temporary thing and recommended massage, but this did not help. The condition not only persisted, but became more aggravated. From the very time the boy became old enough to wear shoes the mother had to get larger ones for his left foot.

The child's birth was perfectly normal. He was circumcised shortly after birth, but there was no trouble with that. He has been a healthy boy and has developed normally, as have both of his sisters. Ten weeks before I saw him, he had what his mother calls an attack of "blood poisoning." He complained on getting up one morning that he could not walk, and later on he became quite sick. The mother had noticed a scratch on the anterior surface of the left leg the day before, but did not think anything of it. From this a reddish area developed and spread all over the leg and up toward the groin. The child had a high fever. The attack lasted for about three weeks, with fever off and on, and the redness remained for the same length of time. After that, pustules developed over the leg, but disappeared in a few days. The mother does not know whether the patient had a chill or not. (This was undoubtedly one of the erysipeloid attacks that are frequently seen in this condition.) Upon questioning the mother carefully, the information was elicited that the patient had a similar attack during the summer of his first year, and that attack lasted about the same length of time as the one just mentioned. He has had only these two attacks. Otherwise he has been in good health and developed well. There has been no similar case in the family.

On examination the patient was found to be a well developed boy who seemed perfectly normal and walked without a limp. The left foot and leg were definitely larger than the right, the thigh being involved, too, but less than the lower leg (*Fig. 1*). The left leg was much paler than the right. On feeling it, it seemed somewhat cool, but not markedly so. One was struck, though, with its brawny hardness. It was not sensitive and there were no ulcers and no veins to be seen. There was no sign of erysipelas at the moment. The inguinal glands on the left side were palpable, but smaller than those on the right. The boy cried a great deal and fought so that it was impossible to examine the arterial circulation. It was afterwards found to be normal. It was also impossible to take measurements. Later on, though, measurements were taken and from time to time these have been repeated. Photographs have also been taken as the child grew older, and one is appended.

On October 8, 1931, the patient was operated upon at the Union Memorial Hospital. An incision was made over the femoral vessels of the upper thigh and the sheath covering them was split to the extent of some three inches. The vessels themselves were normal. Following this the skin and subcutaneous tissue, together with aponeurosis overlying the muscles, were removed from both the inner and outer sides of the lower leg throughout an area of about two inches. I did not feel it wise to do more because of the child's age. The excised tissue was sent to the laboratory and cultured, but no growth was obtained, aerobic or anaerobic.

The child made an uninterrupted recovery, following which Alpine light therapy was begun, together with gentle massage twice a week by a professional masseur. This regime has been adhered to, with certain interruptions, ever since. The boy, as will be noted from his photographs, has grown normally.

It is interesting to note, though, that he has had two additional, though mild, attacks of erysipelas. At least, his mother says they were mild. She had been instructed to call me if he had any such attacks, but on neither occasion did she do so. Both attacks occurred during the summer months, the last being only a minor affair characterized by slight redness and itching of the leg, and malaise. The mother thinks he had no elevation of temperature, though she did not take it. She says he was only slightly ill for two or three days, nothing like the earlier attacks. From which one may or may not feel, as he chooses, that possibly the boy is outgrowing the erysipeloid attacks.

Measurements of the two legs, which are given in a separate table, together with the photograph (*Fig. 2*) seem to indicate that while the process has not been dissipated, it has come to a standstill, which of itself is very much worth while. One thing especially gives encouragement and that is the remarkable change that has taken place in the feel. The leg was brawny hard at the start, whereas it is comparatively soft now, indicating that there is some lymph drainage. The mother herself vouchsafed the information on the change that has taken place in the consistency of the tissues.

To summarize, then, it might be said that a normally born boy began to have swelling of

*Received for publication January 11, 1935.

Fig. 1

Fig. 2

his left leg very early in his life, possibly from birth, that before he was three years old he had had two severe and serious attacks of erysipelas and that the swelling became progressively worse. At three years, when I first saw him, one leg was much larger than the other, was pale white with no veins to be seen, and was brawny hard. At operation his femoral vessels were first decompressed, following which a Kondoleon operation was done. During the three years that have since elapsed Alpine light therapy, combined with massage, has been carried out.

The boy has had two attacks of erysipelas since operation, the last being extremely mild and of short duration. He walks without a limp, but there is 5/8 of an inch real and measured difference between the two legs, the affected one being the longer. X-rays show no difference between the bones of the two legs. If one scans the table of measurements appended, it will be apparent that the relative difference between the legs has remained about the same for the last two years. This, together with the fact that the affected leg is much softer than it formerly was, would seem to indicate that the process is at a standstill. Whether decompression of the femoral vessels had anything at all to do with this apparently fortunate result, whether all credit must go to the Kondoleon operation, whether the combination of the two did it, or whether the condition just became better by itself is a question that must remain undecided at the moment. The chances favor a combination of the two steps. And for the simple reason that rarely (never in my experience) does an idiopathic elephantiasis get well or even come to a standstill of its own accord, and rarely does the Kondoleon operation by itself do much good unless it is done much more radically than was done in the case herein reported. And even then the cases that I have seen and done myself have not been very satisfactory. Every patient has had to wear a compression bandage pretty continuously thereafter. The patient herein mentioned has never worn one.

But quite aside from all this, decompression of the femoral vessels is a rational procedure in such cases as this. John Homans, of Boston, has done much to bring that out. It permits of a freer drainage through such lymph channels as parallel the femoral vessels. At least that is the theory. It is true that I could detect no

MEASUREMENTS

	4 in. Above Tip of Patella		2 in. Above Upper Tip of Patella		2 in. Below Lower Tip of Patella		4 in. Below Tip of Patella		Ankle		Foot	
	Inches Right	Inches Left	Right	Left	Right	Left	Right	Left	Right	Left	Right	Left
10/ 8/31, operat'n			10¾	10	8½	10			6	7¼	6½	7¼
12/14/31			10¾	10¼	8¾	10			6¼	7	7	7
1/18/32			10½	10	8¾	10				7¼		
3/16/32				10¼		9⅞				7¼		6¾
5/17/32	12½	12¼	10	10¾	8⅞	10			6	7½	6½	7
3/ 6/33	13	13	11	11¼	9½	11			6½	8¾	7¾	7¾
4/ 9/34	12½	13	10½	11	9	10¾	9	11	6¼	8¼	7¼	7½
10/ 4/34	12	12½	10½	10½	9¼	10¾	9¾	11	6½	8½	7¼	7½
11/14/34	12	12¼	10¾	11	9	10¾	9½	10¾	6½	8	7	7½
	The rt. leg has dec. ½ in; the left has remained about the same.		The affected leg was smaller than the other, but became about the same size 2 years ago and has remained so.		There is the same difference between the two legs approximately today as there was 3 years ago.		Diff. bet. the two legs is less now than it was. The rt. or unaffected leg has gotten larger, while the affected leg has remained approx. the same.		Three years ago there was a dif. of 1¾ in., while now the dif. is approx. the same.		Three years ago there was a dif. of ¾ in., while today it is but ½ in., a decrease of ¼ in.	

abnormality of the vessels and no evidence within the sheath of a lymph stasis. Nevertheless, it still may be that by removing the restricting membranes there was facilitated a freer drainage of tissue juices. Following this, or concomitant with it, the Kondoleon operation was of real benefit. One at least may have the pleasure of rationalizing. One might also add that the result obtained is suggestive. Whether it will show still further improvement, whether it will remain in *status quo* or whether it will go the way of most such cases, get steadily worse, remains to be seen. Time will tell.

The measurements in table on preceding page show that while both legs have increased in size, the rate of increase has hardly been any greater in the one than the other.

REFERENCE

Homans, John; Drinker, C. K.; and Field, Madeleine: Elephantiasis and the Clinical Implications of Its Experimental Reproduction in Animals. Ann. Surg., **100**:812-832, Oct., 1934.

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LIPOID PNEUMONIA IN CHILDREN*

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The increasing use of a variety of oils in pediatric practice, in the treatment of vitamin deficiencies, in disturbances of the gastro-intestinal tract, and by the local application of oils into the nasopharynx, larynx, and trachea, has occasionally been attended with unexpected pulmonary disease. It has been conclusively shown that small amounts of oils administered by mouth and in the nasopharynx may be aspirated into the trachea, ultimately reach the alveoli, and produce a lipoid pneumonia.

In 1925 Laughlen[1] reported four cases in which he found large quantities of oil in the lungs. Three of his cases were in very young children. He did a series of experiments injecting oil into the trachea of rabbits, which produced the typical endothelial cell infiltration in the lungs. To show that argyrol would not produce a similar reaction, he injected 0.5 c. c. of argyrol into the pharynx of a rabbit for over two months, and at autopsy no endothelial cells were found within the lung alveoli.

*Read in Clinical Session, Texas Pediatric Society, meeting conjointly with Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

Pinkerton[2] in 1927 reported six cases. He found mineral oil alone in two cases, milk fat in one, egg yolk in one, mineral oil and cod liver oil in one, and cod liver oil alone in another. He described the processes by which he identified these various materials, and discussed all the possible sources of fatty material in the lungs. His studies are of great value because they show the sequence of events following aspiration of oily substances. He recognized three characteristic pathological stages. The first showed the alveoli containing oil, the major portion of which was found within large mononuclear cells; the second showed an interstitial fibrosis; the third showed an end result of firm nodular fibrosis of the lung. He concluded that the pathological picture depended upon the length of time the oil had been in the lungs.

In the cases reported only a very few have been diagnosed before death. Rabinovitch and Lederer[3] reported six typical cases, all found at autopsy.

In the 25 cases reported from the Harriet Lane Home by Goodwin,[4] in August this year, only three were recognized clinically before death. Twelve of these children were under six months of age, six between six months and two years, six between two and five years, and the oldest seven years of age. Various oils were responsible for the condition. Milk fat was perhaps the most frequent kind found. These children, as in a majority of the others, including our case, were underdeveloped and poorly nourished. Many of them were fed by gavage vomited frequently, and the regurgitation and aspiration of the milk or other lipoid substances was found to have been the cause of the lipoid pneumonia. Cod liver oil was present in the lungs in many cases. In practically all there was a history of cough, vomiting or struggling against the administration of the oil. In four of the cases at the Harriet Lane Home, in which the amount of pulmonary involvement was the greatest, a definite history of the installation of liquid petrolatum in the nose, or its ingestion, was obtained. It has been definitely proven experimentally that a bland oil, such as liquid petrolatum, placed in the nasopharynx, may find its way into the lungs without inducing symptoms of irritation or cough at the time of aspiration.

Goodwin[4] found the existence of a persistent hacking cough and rapid respirations without

dyspnea to be the two most frequent symptoms. These symptoms, when noted in the debilitated infant, in the absence of fever, should make one suspect the presence of lipoid pneumonia. In all cases pulmonary tuberculosis must be considered and eliminated. In speaking of the clinical diagnosis Goodwin states:

"* * * physical examination indicates only that there is some sort of pulmonary consolidation present. It is to the roentgenogram that one must turn for the greatest help. * * * The consolidation is central, bilateral, more extensive on the right and apt to be posterior. The roentgen shadow is always more extensive than the amount of consolidation suspected from physical examination."

That the amount of oil and the length of time of administration have a definite bearing on the pulmonary lesions there can be no doubt. Moreover, it has been suggested that the chemical composition of the oil may have some influence on the pulmonary reaction. If the quantity of oil which finds its way into the lungs is abundant and the administration is continued over a long time, the inflammatory reaction will be more intense and widespread. It has been shown, both clinically and experimentally, in animals, that within a few minutes after the introduction of oil into the lungs there occurs an inflammatory reaction and an invasion by large monocytes. The elimination of the oily substance, on the other hand, is very slow. Since the introduction of the iodized poppy seed oil as a diagnostic aid in pulmonary conditions, cases of lipoid pneumonia due to this substance have been observed.

There are no accurate diagnostic criteria of lipoid pneumonia. The physical signs in the lungs are negative, or only slight evidence of consolidation is found. Pierson,[5] in describing the roentgenological picture, says:

"The picture produced by the fatty material in the lungs more nearly resembles that of tuberculosis than it does any other with which we are familiar. The areas of consolidation of lipoid pneumonia are more extensive and more clearly defined than those seen in bronchopneumonia, and their borders are not limited by the ordinary anatomical subdivisions of the lungs, as is usually seen in lobar pneumonia. The roentgenologic picture varies from time to time, according to the different phases of the disease."

In our case there was a slow progressive increase in the consolidation. It has been suggested by several writers that the finding of monocytes containing oil droplets in expectorated material might be diagnostic.

CASE REPORT

Case 1.—A girl, aged two months, was first seen September 15, 1933, because of cough for two weeks, projectile vomiting, constipation, and failure to gain properly. The family history was irrelevant. The infant weighed six pounds thirteen ounces at birth. She had been fed various formulas unsuccessfully and had continued to vomit projectilly until treatment by atropine. The mother had been giving the baby three teaspoonfuls of liquid petrolatum night and morning for constipation, and on several occasions had to force the oil down, which was frequently accompanied by strangling, coughing and occasionally by cyanosis. The baby had been given this oil for five weeks.

Physical Examination.—The physical examination revealed an undernourished white female of two months. There was cyanosis around the mouth during crying. There was a slight retraction of the sternum on inspiration and the breath sounds were diminished over the right upper anteriorly and right base posteriorly. The respiratory rate was 60. The heart was normal. No rales or other abnormalities were noted on physical examination. The radiologist's report of the lung findings was:

"Considerable enlargement of the thymus gland is observed here, the superior mediastinum being almost filled. There is also a marked atelectasis of the entire upper right lobe."

X-ray treatments were given over the thymic area. The 1-1000 and 1-100 Mantoux tests were negative. There were 4,820,000 red blood cells, with 75 per cent hemoglobin, 13,900 white blood cells, with 45 per cent small mononuclears, 4 per cent large mononuclears, and 51 per cent polymorphonuclears. The Wassermann, Kahn and Kline tests were negative.

Course.—The infant continued to gain, but very slowly. The cough decreased, and all vomiting stopped. At 4½ months, solid foods were begun, but the appetite was always poor. Haliver oil with viosterol was given in ten-drop doses once a day, but no other oil was given. There were no changes in the lung findings until February 1, 1934, when the breath sounds over the left lower lung were noted to be bronchial. At this time the infant began to have afternoon temperature, occasionally going as high as 101°, which continued until death three months later. The radiologist's report February 4, 1934, was:

"Plates taken at a number of different densities and stages of respiration show the trachea located in the mid-line, a little small but open. There is contraction of the lower lobe of the right lung that leaves a very straight outer border and the lung is not fully collapsed. The upper lobe of the right lung shows atelectasis of a varying density. When the baby is in the upright position and quiet, this portion of the lung shows some areation. The left lung shows some central infiltration with some infiltration of the bronchi. There is a wedge-shaped tumefaction in the upper mediastinum that suggests thymic shadow."

X-ray treatments were again given. The baby developed an upper respiratory infection and died May 16, 1934.

Autopsy.—The autopsy was performed three hours after death. The nourishment and development were very poor. The observations relative to this study were noted in the lungs. The external surfaces of the lungs were smooth, moist and pale yellow in color, mottled with only a few reddish areas over the bases and in the right middle lobe. When laid on the table, the lungs held their shape instead of collapsing, and had a rather firm rubbery feel. The cut surface had the appearance of fatty degeneration of the liver tissue, but

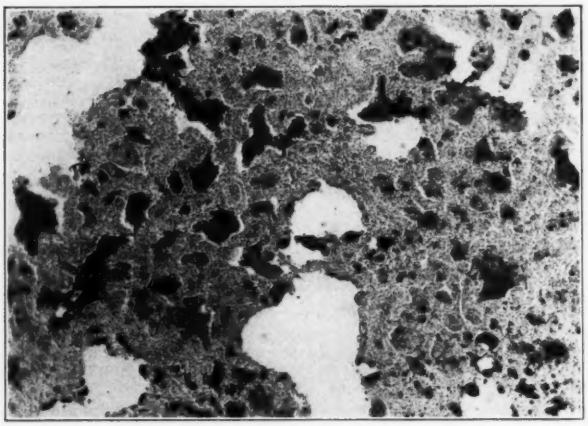

Fig. 1
Scharlach R. stain showing the engulfed lipoid material (black on print).

no fat could be scraped away. This involvement was throughout both lungs and involved fully eight-tenths of the parenchyma. On microscopic examination the only observations of importance were noted in the lungs. These presented a striking picture. In many sections the alveoli were lined with cuboidal epithelium and thickened by invasion with fat-laden mononuclear cells. In some sections there were a number of polymorphonuclear cells and a few eosinophils. Scharlach R. stained the fat a bright red (*Fig. 1*). This lipoid material was seen in the giant cells and mononuclears and free in the alveolar walls. A very small amount of fat was seen free in the alveola.

SUMMARY

(1) It is evident that pulmonary inflammations due to the aspiration of lipoids are not detected often enough clinically. This is mainly because the initial lesion in the lungs is not sufficiently widespread to show any characteristic clinical or roentgenological signs. The great majority, in fact practically all of the cases reported, including our own, have been diagnosed postmortem.

(2) It has been suggested that a diagnosis can be made if there is a history of administration of an oily substance via the nasopharynx, or orally over a long period of time, which, if followed by hacking cough, rapid respirations without dyspnea, atypical pulmonary consolidation, which is central posterior and mostly on the right, when present in a debilitated infant, should make one suspect lipoid pneumonia. Tuberculosis, of course, must be ruled out. The finding of mononuclear cells containing lipoid substances in expectorated material has been suggested, but not conclusively proven of diagnostic value.

The present study indicates the need for conservatism in the treatment of children by means of oily substances administered via the nasopharynx, as well as orally. For the present, at least, we have discontinued the use of liquid petrolatum as a cathartic, and the use of oil drops of a similar nature in the nose in small undernourished infants. When cod liver oil is poorly taken it seems best to give one of the more concentrated preparations, even though the antirachitic potency is probably not as high. In the light of the present findings relative to the use of lipoid substances it would seem to be the best policy to sound a note of warning and to advise the necessary precautions as to their general use.

BIBLIOGRAPHY

1. Laughlen, A. F.: Amer. Jour. Path., **1**: No. 4, July, 1925.
2. Pinkerton, H.: Amer. Jour. Dis. Child., **33**: Feb., 1927.
3. Rabinovitch, J.; and Lederer, M.: Arch. Path., **17**: Feb., 1934.
4. Goodwin, T. Campbell: Lipoid Cell Pneumonia. Amer. Jour. Dis. Child., **48**: No. 2, Aug., 1934.
5. Pierson, J. W.: Some Unusual Pneumonias Associated with the Aspiration of Fats and Oils in the Lungs. Amer. Jour. Roentgenol. & Rad. Ther., **27**: No. 4, April, 1932.

PANSINUSECTOMY*

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Pansinusectomy is a radical operation that comprises the removal of the contents of all sinuses on one or the other side of the head, or both, and therefore may be spoken of as a right or left or a bilateral pansinusectomy.

It combines several operative procedures previously described in medical literature to which has been added many additional facilitating measures. It permits the surgeon not only to thoroughly eradicate the contents of the frontal and maxillary sinuses, but more easily and more thoroughly to exenterate the ethmoids and sphenoid sinuses, which was heretofore a very difficult accomplishment.

It affords a wide open approach to the spheno-ethmoid region from above through the external incision, and below through the antrum,

*Read in Clinical Session, Texas Ophthalmological and Otolaryngological Society, meeting conjointly with Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

Fig. 1

The incision is carried through the eyebrow to the inner corner of the orbit and curved downward on the lateral wall of the nose at the bridge. The curved portion is crossed by a superficial incision bisecting the wound incision in the region of the contemplated skin incision. This marker is made before the skin is incised.

and is considerably more accessible than the nasal approach. In addition, it offers a patient suffering with a pansinusitis an opportunity for a cure with one operation, rather than, as in the past, by many unsatisfactory conservative or several so-called radical operations, which no doubt have been responsible for the present prevailing attitude of the laity:

"Never a sinus operation without another, and never any relief after a sinus operation."

In an existing pansinusitis affecting the sinuses of both sides, all may be satisfactorily exenterated by two operations, whereas in the past six, eight, or more operations were not infrequent. In some instances reinfection of the sinus which was previously operated upon has developed from the adjacent infected non-operated one while waiting for the patient to decide upon a date for the next operation, and surely no surgeon can condemn a patient for procrastination where eight or more operations are contemplated.

It is the author's opinion after an experience of eleven cases that it offers the best procedure at our command today for the treatment of non-specific pansinusitis of the non-recuperable metaplastic, degenerative, atrophic and mixed types. To emphasize this point it must be understood that all sinuses on one or both sides are involved and the pathologic process is beyond repair with the aid of non-surgical (palliative and conservative), constructive surgical (submucous resection of the nasal septum, infraction of turbinates, *etc.*), and minor surgical procedures (naso-antral, naso-frontal, sphenoidal opening). The sinusitis may be periodically or permanently purulent, but whatever changes exist, the epithelium and tunica propria with its stroma, glands, blood vessels, and so on, are altered to such an extent as to inhibit normal physiology.

PREOPERATIVE PREPARATION

Preoperative preparation requires alkalinization of the patient for several days before operation. Oral hygiene is insisted upon and especially emphasized the morning of the operation. An ischemic drug is used as an hygienic measure in the nose. Morphine gr. ¼ and atropine gr. 1/150 as a hypodermic is administered half an hour before operation.

The anesthetic is general. Ethylene is used as an induction followed by ether insufflation through an oral tip.

Fig. 2

Lateral view. All ethmoids are removed, including the lamina papyracea, as far posterior as the optic foramen. Both anterior and posterior ethmoidal foramina have been removed and ethmoidal vessels ligated.

Fig. 3

Anteroposterior view of skull. The floor of the frontal is removed and the supra-orbital ethmoid cells are exenterated. One large posterior ethmoid cell overlying the sphenoid and separated from it by a septum is clearly visible. Note the cribriform plate to the inner side of the border of the mesial wall of ethmoid labyrinth, also the close proximity of the sphenoid sinus to the optic foramen.

ethmo-sphenoid approach outlined by Lynch is carried out first, followed by the trans-antral sphenoethmoid approach through the canine fossa. Prior to the frontal incision, which is made through the eyebrow and curved from its horizontal plane to the vertical plane down the side of the nose at the bridge to the inner side of and in front of the anterior lacrimal crest, a small superficial skin incision is previously made at the curve of the contemplated incision to facilitate accurate closure of the wound (*Fig. 1*). The wound incision is carried through the skin, superficial fascia and periosteum. The lower lip of the incision is elevated, separating the periorbita from the bony orbital wall until the anterior ethmoidal vessels are visible, at which point they are ligated and severed from the foramen. The periorbita is retracted as far as the posterior ethmoid

TECHNIC

The field of operation is prepared as follows: The face is thoroughly washed with soap and water before the patient's admission to the operating room. Under anesthesia, alcohol is applied to the face, vestibule of the nose and oral cavity over and beyond the field of operation. This is followed by picric acid 5 per cent in alcohol over similar areas. The field of operation is draped with sterile towels and several layers of gauze are placed over the mouth. One Michel clip is applied to the lids of the eye to avoid injury to the cornea and conjunctiva. At this stage a postnasal pack is inserted into the nasopharynx to avoid aspiration of blood or other materials into the lower respiratory tract.

The operation is divided into two approaches. The external radical fronto-

Fig. 4

The sphenoid sinus is visible through the antrum after the posterior superior wall of antrum is removed. Notice the accessibility to the infra-orbital ethmoid cells.

Fig. 5
Right pansinusectomy. Note the almost invisible scar showing the usual cosmetic effect.

vessels. If found rather far forward they likewise are ligated as this part of the lamina is removed (*Fig. 2*). Rarely has it become necessary to elevate the periorbita as far as the optic foramen. Once this occurred in removing a sequestrum involving the lamina papyracea (*Fig. 3*). The sinuses are entered by gauging at the "T" suture land mark formed by the articulation of the nasal process of the superior maxilla and lacrimal bone below with the frontal bone above. This is always visible at the curved part of the wound. It will be noted here that the upper lip of the incision is allowed to remain attached to the frontal bone, as elevation of the periosteum will interfere with nutrition of the anterior bony wall of the frontal sinus, thereby encouraging osteomyelitis. The only exception to this rule should be when pre-existing osteomyelitis is present, in which case removal of the pathologic bone is imperative. After removing the bony floor of the frontal sinus and being particularly sure to obliterate the outer angle of the frontal and to avoid injury of the frontal plate, the entire mucosa is extirpated. Attention is then devoted to the ethmoids and sphenoid; the lamina papyracea or orbital plate of the ethmoid is removed, consistent with thorough removal of the ethmoids overlying the orbit (*Fig. 3*). The lower orbital cells are considered in the second approach through the antrum. At this stage the external frontal wound is loosely packed with gauze and covered by a sterile towel.

The gauze which was placed over the mouth in the preparation of the operative field is removed, and the second approach is carried out through the antrum, which is opened at the gingivolabial junction through the canine fossa as in the usual Caldwell-Luc. After thoroughly eradicating the antrum mucosa, the remaining infra-orbital anterior and posterior ethmoid cells not easily accessible through the external approach above are exenterated through the antrum (*Fig. 4*). The upper pack is removed from the wound and through both openings every vestige of mucosa in all the sinuses is removed. Through these two approaches every sinus is accessible. Therefore, there is no reason why any cell or sinus should be overlooked or its mucosa unsatisfactorily exenterated, not excepting any abnormalities such as extension of the sphenoid sinus into the pterygoid process, and so forth. After resecting the naso-antral wall of the inferior meatus, iodine is applied, an iodoform pack is inserted, and the wound is closed with interrupted plain catgut sutures. The end of the pack is brought through the naso-antral opening and placed into the inferior meatus, where it may be easily found on removal.

Attention is now given the frontal wound. After the application of iodine a larger rubber tube drain is inserted into the frontal sinus through the anterior nares and an iodoform gauze pack is inserted into the ethmosphenoid space. Soft tissue is sutured with plain catgut interrupted sutures. One double suture is carried through the periosteum above and periorbita below at the region of pulley of the superior oblique muscle in order to replace accurately the

Fig. 6
Bilateral pansinusectomy. Note the almost invisible scars.

periorbita, thereby preventing diplopia. Interrupted plain catgut sutures are used to complete the subcutaneous closure. The skin is closed with Michel clips, using the bisection incision as a guide. The post-nasal pack is removed and a monocular bandage is applied. The antral and ethmoid packs are removed in 24 hours, whereas the frontal tube is allowed to remain from three to four days. After removal of the frontal rubber tube drain, the frontal passage is kept open by dilatations during each treatment. Lavage of the sinuses is carried out as consistent with improvement.

After recovery the patients are symptomatically well. There is no deformity and the cosmetic result is excellent (*Figs. 5* and *6*).

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THE TECHNIC OF BRONCHIAL LAVAGE*

DEMONSTRATION WITH PATIENT

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The treatment of advanced bronchiectasis has always been unsatisfactory. We are all familiar with patients who have gone through years of coughing, suffering, expectorating, who have had vaccines, iodides, lipiodol and air injections, phrenic nerve evulsions, and chiropractic adjustments, with progression of symptoms and an eventual death from exhaustion, pneumonia, amyloidosis or brain abscess. Following the demonstration by Kolmer[1] of a safe, effective bacteriocide for intrabronchial injection and the work of Stitt[2] with bronchial lavage through a hard rubber catheter introduced directly into the bronchi, I began to treat a very severe case of bronchiectasis by bronchial lavage. The method of lavage differs from that used by Stitt, and in my opinion is both safe and simple. It is this method which we wish to demonstrate.

The patient is seated comfortably in a chair and inclined toward the side desired for lavage. The head is held back and the tongue pulled forward. This position makes swallowing difficult, but permits the easy flow of the solution into the trachea and bronchi. No anesthetic is necessary and none is used. The tip of a No. 12 French catheter is placed on the base of the tongue and held in a comfortable position by the patient. While the patient breathes normally, the hypertonic saline solution of Bledsoe-Fisher† is introduced by gravity through a 20 c. c. Luer syringe. An amount of solution sufficient to fill the dilated bronchi and cavities but less than enough to interfere with respiration, is injected. This amount is determined by trial and varies from as little as 30 c. c. in one patient to as much as 400 c. c. in this one. After the proper amount of fluid has been injected, the patient sits quietly to permit the retained pus to float out of the cavities. The pus and the salt solution are then expelled by postural drainage and the procedure is repeated until the washings are clear. We then inject 100 c. c. of a 1:2,000 aqueous solution of sodium ethylmercurithioralicylete (merthiolate), which is permitted to remain in the lung for five minutes. It is then drained and 5 c. c. of endolysin (Lilly) is injected, to remain. The amount of solution used, the number of washings necessary, and the frequency of lavage varies with the size of the cavities, the amount of secretion, and the condition of the patient.

This young man of 23 has had a severe bronchiectasis for 15 years following an attack of influenza and pansinusitis. When I first saw him five years ago, he weighed 89 pounds, had multiple bronchiectatic abscesses in both lungs and a chronic involvement of all the paranasal sinuses. He had taken excellent care of himself, led an ideal outdoor life, followed good medical advice, but progressed steadily downward. His sinuses had not then and have not now been operated upon, because it has been the opinion of several men that the risk involved, in view of the well established chest disease, was greater than the eventual prognosis warranted. The net result until 8 months ago of 14 years of lipiodol injections, postural drainages, vaccines, *et cetera ad infinitum*, was a weak, dyspneic, unhappy young man with a pigeon shaped chest and clubbed fingers. He was draining daily, believe it or not, an average of 1,500 c. c. of the foulest of sputum. His general condition was very poor. Postural chest drainage of about 6 ounces three or four times each night was required to prevent coughing and permit sleep. The marked pulmonary disease is shown in the chest ray. At this time bronchial lavage was begun and all other treatment except postural drainage discontinued. Originally following lavage we injected 20 c. c. of the organic mercury compound and 5 c. c. of an endolysin into each side and left it there for six hours. A faint trace of albumin appeared. The mercury solution was then drained after five minutes. The albumin was not found again. We began injecting 100 c. c. of the organic mercury solution for five minutes, followed by

*Read in Clinical Session, Medical, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

†Stock solution:

Sodium chloride	263.7 grams
Calcium chloride, dessie	21.0 grams
Potassium chloride	10.6 grams
Distilled water q. s. a. d.	1,000.0 c. c.

Irrigating solution, 10 c. c. of stock solution to 250 c. c. distilled water.

endolysin. The patient has had 74 bronchial lavages and 734,200 cubic centimeter-minutes of exposure to the mercury antiseptic over a period of 8 months. The results have been a lessening of the daily drainage from 1,500 to 160 c. c., a gain in weight of 10 pounds, a decided gain in strength and well being, a marked lessening of the odor, and a distinct improvement in the chest ray. We now feel that improvement has reached the

Fig. 1 Fig. 2 Fig. 3

Fig. 1. Showing method of lavage. Head back, tongue out, catheter held comfortably on base of tongue by patient; flow can be stopped at will by patient; solution flows through 20 c. c. Luer syringe and No. 12 F. catheter by gravity.

Fig. 2. Showing pigeon chest deformity, lower sternal retraction and emaciation of patient used for demonstration.

Fig. 3. Showing material obtained following lavage. The pus rises to the top of the hypertonic saline solution. Over 500 c. c. of pus was obtained from this patient by lavage after postural drainage had been done.

Fig. 4

Flat plate of same patient taken February 22, 1934, without lipiodol, showing extensive hilar and peribronchial thickening; marked bronchiectatic cavities both bases; questionable tuberculous scarring right apex.

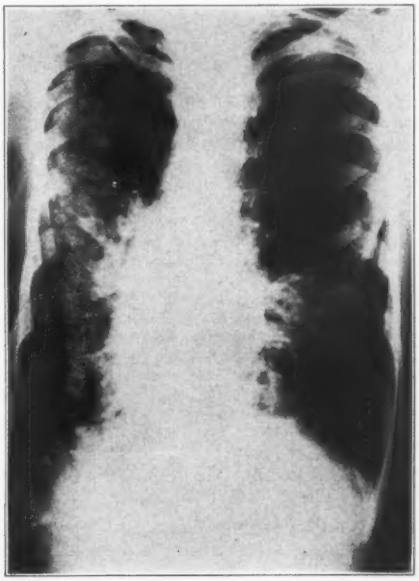

Fig. 5

Flat plate taken six months after bronchial lavages were begun. Note reduction of peribronchial infiltration and decided improvement in the x-ray findings.

point where operative intervention for his chronic sinusitis is justified and shall soon be done.

I also wish to review the case of a Catholic nun of 58 referred by Dr. J. W. Nixon, who complained of a chronic dyspepsia of many years' duration and a cough with purulent expectoration for as long as she could remember. Repeated gastro-intestinal studies had shown no organic disease and all manner of treatment had failed to produce real benefit. She denied any history of a sinusitis, but x-rays of her sinuses showed poor development, which was interpreted as an early childhood involvement. She subsequently developed an acute sinusitis and purulent material was obtained upon puncture. Her sinuses are to receive operative treatment. Bacteriological studies, a bronchoscopic examination by Dr. A. N. Champion, chest rays and finally a lipiodol injection confirmed the diagnosis of a bilateral lower lobe bronchiectasis. On April 25 the first lavage was done. It may be seen from the lipiodol injection that the dilatations are not large. In view of the varying amount of solution which one is able to inject without discomfort, it is probable that little if any of the solution will flow into the smaller bronchi if they are not dilated. Whereas the large cavities of the young man will hold 400 c. c. of solution comfortably, this patient will become cyanotic or cough if more than 30 c. c. are injected at one time.

The plan of treatment has been limited in this patient because of her age and, in the beginning, her extreme weakness. We have given her only one lavage a week, using 250 c. c. of the solution, and have permitted her to cough it up in the upright position. When the washings are clear, 5 c. c. of an endolysin are injected on each side and permitted to remain until it is coughed up naturally. On four occasions we injected metaphen in rapeseed oil, but she insisted that it upset her stomach and the preparation was discontinued.

The results of 25 treatments in as many weeks have been a gain in weight from 98 to 110 pounds; a decided gain in strength and well being; a distinct lessening of the cough and a reduction in the average daily expectoration from 12 to 3 ounces. She has gone from the hospital to resume her full duties as a teacher in an orphans' home.

One patient did not improve. She has a chronic bronchiectasis following a pan-sinusitis in 1927. Her sinuses were treated radically and did well. Her bronchiectasis was treated in every possible way and did badly. She was sent home to die from one of our best sanatoria. With nothing to work on but a bad chest and a worse prognosis, bronchial lavage was done 25 times. The patient was extremely weak and the lavage was followed by a moderate rise in temperature and not infrequently a chill. Though there was some improvement in the chest condition, she was losing some of her 86 pounds and we felt that the lavages were too exhausting. She has subsequently gained 8 pounds, but her general condition is very poor and her prognosis unfavorable.

I wish to thank the patient, Mr. Palmer Christa, and Miss Alma Skerik, for the demonstration, and to express to you my appreciation for the privilege of presenting a method of treatment we believe to be hopeful, and a technic for bronchial lavage which I believe to be both safe and simple. The cases selected for treatment and here cited are cases which I considered and still do consider hopeless. I selected them with their full consent because they had nothing to lose and everything to gain; because all manner of treatment had failed to improve their conditions, and because I feel that if these cases may be helped, milder cases may be treated with a brighter prospect for cure. The method is not advocated as a substitution for other well known methods of treatment, but is suggested as a possibly beneficial adjunct.

BIBLIOGRAPHY

1. Kolmer, John A.: Arch. Int. Med., **51**:346-366, March, 1933.
2. Stitt, H. L.: Jour. Med., Cincinnati, Ohio, Jan., 1934.

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TREATMENT OF TRIGEMINAL NEURALGIA, WITH ESPECIAL REFERENCE TO ALCOHOL INJECTION*

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Neuralgia of the fifth cranial nerve is one of the most painful and, at times, one of the most disabling of all diseases. By far the most common form of trigeminal neuralgia is the paroxysmal type called "tic douloureux" by Nicolous Andre, of France, in 1756. This appropriate name is still used, since it well describes the striking features of a typical attack, namely, paroxysmal pain of such excruciating severity that the sudden onset is accompanied by an involuntary spasmodic contraction of facial muscles. The essential diagnostic features are: (1) the paroxysmal type of pain; (2) limitation of the pain to areas supplied by one or more branches of the trigeminal nerve; (3) incitation of the pain by stimuli to the sensory end-organs of these branches. The usual sudden onset and sudden cessation of lancinating pain may not always occur, as at times there may be a slow onset of gradually increasing severity and a gradual subsidence. The duration of either type varies from a few seconds to an hour, and the pains may recur in rapid succession for a period of hours, or even days.

Recognition of "tic douloureux" (the paroxysmal type of trigeminal neuralgia) is usually not difficult, and when the diagnosis is made steps

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*Read in Clinical Session, Surgical, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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may be taken immediately to relieve the patient's suffering. Only one thing can possibly be done to bring about relief, and that is interruption of the nerve impulses in the affected branch or branches. Relief from pain can be given temporarily by peripheral neurectomy or by alcohol injection of the nerve at its foramen of exit. Permanent relief can be assured only by section of the sensory root of the fifth nerve proximal to the gasserian ganglion. It is useless to delay relieving the pain for protracted search and elimination of possible foci of infection. The etiology of true "tic douloureux" is unknown, but it has been well established that it cannot be relieved by removal of infectious foci. Rarely tumors have been found pressing on the sensory root and causing pain of the "tic douloureux" type, but no cause whatever can be demonstrated for the great majority of cases. Consequently, when the diagnosis is made, temporary or permanent measures for relief can be instituted, the choice depending upon the patient's wishes or the demands of the particular situation.

The only confusion in diagnosis may arise from the possible occurrence of: (1) trigeminal neuralgia of the nonparoxysmal type, which is rare, and usually directly traceable to an infectious process or a tumor; (2) sympathetic neuralgia which may be paroxysmal but has no characteristic distribution, is not incited by cutaneous stimulation, and is usually accompanied by signs of sympathetic nerve stimulation such as lacrimation, sweating, and flushing; and (3) pains of psychogenic origin, which vary in distribution, mode of onset, and severity.

Section of the sensory nerve root, either partial or total, is the only means of obtaining permanent relief from the pain of "tic douloureux." This fact should be presented to the patient, but at the same time the possibility of obtaining complete, though temporary, relief by alcohol injection should be pointed out. Although the operative mortality in nerve root section is very low when the operation is done by a skilled surgeon, still even the slight danger must be considered and the patient allowed to consider a safer means of relief if he prefers. In a certain number operation may be contraindicated by physical infirmities. When operation is refused, or is impossible, alcohol injection, even though it may have to be repeated a number of times, offers a relatively safe and sure means for relieving the tortures of this dreadful disease.

The following account of the procedure and its results is based on an experience with more than 150 cases in which alcohol injection was used one or more times. A table summarizing the histories of forty of these patients from whom reports of late results could be obtained, is included. Studies of these cases were made in connection with a senior thesis by Drs. C. K. Miller and B. G. Yeager, recent graduates of Baylor University Medical School.

The injection of the nerves with some tissue fixative as a means of controlling neuralgias, particularly those of the face, was first done by Bartholow in 1874; chloroform was used but was promptly abandoned. Osmic acid, proposed by Billroth and Neuber in 1884, then had its period of popularity. Injections were first made into the nerve foramina. The relief of pain was of short duration and the results inconstant.

An improvement on these methods, with much more satisfactory results, was introduced in 1902 in France by Pitres and Verger, and in 1903 by Schlosser in Germany, in the form of deep injections of alcohol into nerves near their foramina of exit from the skull, the foramen ovale and rotundum. In 1907 injections were done in this country by Ostwald.

Cushing's address before the College of Physicians in Philadelphia, in 1919, on "The Major Trigeminal Neuralgias," emphasized the fact that deep intracranial injections of alcohol into the maxillary and mandibular nerve trunks had replaced peripheral neurectomies. He suggested the use of injection prior to the section of the sensory root in order to acquaint the patient with the character of numbness resulting from such an operation.

A discussion of the subject by Wilfred Harris, in 1922, included a description of the effect of alcohol on nerve tissue, as follows:

"Strong alcohol (95 per cent) being a tissue fixative, coagulates the albuminous elements of the nerve fibers and dissolves the fatty sheath of Schwan. Degeneration downward of the nerve then results from the point of injection. Regeneration of the nerve fiber occurs in the ordinary course and may be more or less complete in two years."

Harris felt that freedom from the neuralgia might practically be guaranteed for twelve months, if the nerve had been properly injected, and in the majority of his cases the immunity from pain had been much longer, ranging up to thirteen years in the case of third division neuralgias. Four and five years was quite a common period for the immunity to last in his experience.

The technic of injection used in my series varies somewhat from that commonly employed. I use a modification of the "Levy-Baudouin" method. Grant and Frazier suggested a method of determining the angle and the line of insertion of the needle to reach these nerves based on certain calculations and skull averages, using a "zygometer" and protractor. I feel that such complications are unnecessary and sometimes misleading. An accurate working knowledge of the anatomy of the zygomatic and sphenomaxillary fossae, and their contents, modified to allow for anatomical variations, is all that is needed. The principles employed in my injections are as follows:

First Division.—The supra-orbital nerve usually passes through a groove, or even bony foramen in the supra-orbital ridge, at a distance of about one inch from the midline. This point is easily located by passing the finger nail along the supra-orbital ridge until the notch is found. The nerve can be injected at this point with 1 c. c. 95 per cent alcohol through a hypodermic needle fitted on to a small syringe.

Second Division.—In cases of second division neuralgia, when pain involves the upper lip and side of the nose, the infra-orbital branch alone is injected. An intradermal wheal is made with novocaine in the skin of the cheek at a point about one-fourth of an inch out and above the lower border of the ala nasi, using a hypodermic needle. A slightly larger needle is introduced through this wheal, directed upwards and laterally so as to enter the infra-orbital foramen, the left finger being kept firmly pressed on the lower orbital margin in order to feel the needle should it slip over this ridge towards the orbit instead of under it into the foramen. As soon as the nerve is punctured the patient will immediately complain of severe pain in the upper lip and nose. One or two c. c. of 95 per cent alcohol are then injected.

Third Division.—When the neuralgia involves only the lower lip, only that superficial branch passing through the mental foramen is injected. For more extensive involvement injection is made in the mandibular division at its exit from the foramen ovale. By making the injection here the auriculotemporal and the lingual nerves, as well as the inferior dental, are anesthetized. In approaching the foramen ovale the articulated skull with the lower jaw is held close by for comparison. At a point just below the middle of the zygomatic arch an intradermal wheal is raised with novocaine. A long needle (spinal puncture size) is inserted through the skin under the midpoint of the bony arch. The direction now must not be directly inward, but slightly posteriorly and superiorly, staying close to the base of the skull. As this depth varies in different skulls, the line of direction of the needle will vary from 15° posteriorly to practically straight inward, and the depth at which the nerve may be struck will vary as much as an inch or more in thin and fat individuals. The needle is passed in this direction for about an inch, or a little more, then directed slightly inferiorly in order to strike the external pterygoid plate. This landmark will be a useful indication of the correct depth necessary, as the foramen lies immediately behind the upper posterior border of the plate. The needle should then be worked posteriorly until its point slides off the back edge of the plate. Then the point of the needle is slightly raised by depressing the mount, and the needle point should touch the nerve as it emerges from the foramen. When the nerve is struck by the needle the patient will complain of violent burning pain in the nerve distribution. At this point alcohol is injected two or three drops at a time until about a cubic centimeter has been used, before which time total anesthesia should have been produced.

Comment.—The average age incidence in my series of 150 cases was 54 years, the youngest being 31 and the oldest 92. Adson, in a larger series of cases, found that the average age was 53, the youngest patient being 17, and the oldest 88. It is apparent, therefore, that the disease is one usually affecting the fifth and sixth decades. It occurs in both male and female, attacking the female approximately twice as often as the male.

In this series it was found that symptoms occurred most often in the right side of the face. The division most frequently involved was the mandibular, the maxillary next, and the ophthalmic division last.

The average duration of symptoms before treatment by injection was approximately five years. Adson reports the average duration of the disease, before treatment, as being from four to seven years.

Various complications have been observed following alcohol injections, the more important of which are middle-ear deafness, sloughing of the nasal bones, paralysis of the oculomotor nerves, puncture of the middle meningeal, or a branch of the internal maxillary artery with considerable

RESULTS OF ALCOHOL INJECTION IN 40 CASES OF TRIGEMINAL NEURALGIA

Case Number	Patient's Initials	Age	Sex	Onset of Symptoms	Branch Involved	Date of First Injection. Results and Compli-cations	Period of Relief in Mos.	Date of Second and Subsequent Injections. Results and Complications	Present Status of Patient
1	WSL	38	M	12/32	2 & 3 R	8/28/33, immediate relief; no complications	5	1/16/34, immediate relief; no complications	Free of symptoms to date
2	TRW	72	F	1/30	1, 2 & 3 R	6/9/31, immediate relief; no complications	10	4/1/32, relief only in first branch; 5/9/32, 2 and 3 injected, immediate relief. Symptoms returned 9/20/33; 2 and 3 injected with immediate relief	Free of symptoms to date
3	LW	40	F	1/31	3 R	5/5/31, immediate relief; no complications	5	10/2/31, immediate relief; 5/6/33, immediate relief; no complications	Free of symptoms to date
4	LL	78	F	9/32	3 L	11/17/32, 2 weeks before obtaining complete relief; no complications	17		Free of symptoms to date
5	CRB	59	M	4/30	2 L	3/30/33, immediate relief; no complications	10	2/20/34, partial relief; reinjected 4/9/34 with immediate relief; no complications	Free of symptoms to date
6	BCM	41	M	7/29	2 & 3 R	6/6/31, immediate relief; no complications	10		Avulsion of sensory root of fifth nerve 6/11/32. Complete relief
7	WCM	62	M	/29	3 L	4/19/33, no relief; reinjected; 4/20/33, immediate relief	12	4/4/34, immediate relief; no complications	Free of symptoms to date
8	NBM	77	F	10/28	2 & 3 R	11/16/32, partial relief; no complications. Reinjected 11/19/32, immediate relief	17		Free of symptoms to date
9	JSN	49	F	7/22	2 R	11/29/29, immediate relief; no complications	27	2/22/32, immediate relief; no complications	Free of symptoms to date
10	JES	49	F	7/23	1, 2 & 3 L	6/5/30, immediate relief; no complications	12	7/15/31, partial relief; reinjected 7/5/33, immediate relief; no complications	Symptoms recurred 2/23/34
11	JAA	80	M	2/21	2 R	3/26/25, immediate relief; no complications	48	3/13/29, immediate relief; 3/31/33, immediate relief; no complications	Free of symptoms to date
12	MC	50	M	4/30	2 & 3 R	6/13/33, no relief; reinjected 6/15/33, immediate relief; no complications	9		Free of symptoms to date
13	REC	55	F	4/99	1, 2 & 3 L	8/1/22, immediate relief; no complications	84	11/16/29, 3 weeks before obtaining complete relief. Reinjected 9/22/30, immediate relief. Reinjected 4/25/31, immediate relief. Reinjected 6/10/33, gradual relief	Free of symptoms to date
14	CAB	62	F	6/30	1, 2 & 3 R	6/6/33, immediate relief; no complications	2	8/29/33, partial relief	Symptoms recurred 2/34
15	HA	31	F	5/31	3 R	1/1/32, immediate relief; no complications	28		Free of symptoms to date
16	WFK	67	M	11/30	2 & 3 R	12/15/32, immediate relief; no complications	16		Free of symptoms to date
17	AH	43	F	6/28	2 & 3 R	9/17/28, immediate relief; no complications	15	1/28/30, immediate relief. Pain recurred 18 months later	Avulsion of sensory root of fifth nerve 6/2/30. Free of symptoms to date

RESULTS OF ALCOHOL INJECTION IN 40 CASES OF TRIGEMINAL NEURALGIA

Case Number	Patient's Initials	Age	Sex	Onset of Symptoms	Branch Involved	Date of First Injection. Results and Complications	Period of Relief in Mos.	Date of Second and Subsequent Injections. Results and Complications	Present Status of Patient
18	GGH	54	F	3/28	3 L	3/28/33, immediate relief; no complications	7	12/2/33, immediate relief; no complications	Free of symptoms to date
19	CA	44	F	8/29	3 R	1/25/32, partial relief; reinjected 2/1/32, immediate relief; no complications	18	7/2/33, immediate relief. Reinjected 12/2/33, immediate relief; no complications	Free of symptoms to date
20	NBB	58	F	5/30	3 R	4/20/33, no relief; 4/21/33, no relief; 4/24-33, immediate relief; no complications	12		Free of symptoms to date
21	JRC	47	M	7/28	3 R 2 & 3 L	9/29/30, immediate relief; no complications	12	9/25/31, immediate relief. Reinjected 8/28/32, partial relief. Reinjected 9/15/32, immediate relief. Reinjected 7/18/33, immediate relief; no complications	Symptoms recurred 4/1/34
22	BMC	34	F	8/27	3 R	9/28/29, immediate relief; no complications	13	10/20/30, immediate relief. Reinjected 11/2/32, partial relief. Reinjected 1/3/33, immediate relief; no complications	Free of symptoms to date
23	WFR	42	M	4/26	3 R	6/15/29, partial relief; reinjected 6/20/29, immediate relief; no complications	4	10/17/29, immediate relief; 6/20/31, partial relief. Reinjected 8/22/31, immediate relief. Reinjected 6/18/32, immediate relief. Reinjected 11/16/33, immediate relief; no complications	Free of symptoms to date
24	WSW	36	M	7/30	2 & 3 R	8/28/33, immediate relief; no complications	5	1/16/34, immediate relief; no complications	Free of symptoms to date
25	CDM	50	F	8/25	3 R	9/22/29, immediate relief; no complications	48	10/11/33, immediate relief; no complications	Free of symptoms to date
26	LBB	58	F	9/27	2 & 3 R	5/18/30, no relief; reinjected 5/19/30, immediate relief; no complications	25	6/2/32, immediate relief. Reinjected 1/4/33, immediate relief; 10/15/33, immediate relief; no complications	Symptoms have recently recurred
27	LSB	56	F	8/28	3 R	10/28/32, immediate relief; complications	18		Free of symptoms to date
28	JD	46	F	8/17	2 & 3 R	7/9/27, immediate relief no complications	15	2/12/29, immediate relief. Reinjected 5/17/31, immediate relief; no complications	Free of symptoms to date
29	REB	53	F	9/31	2 & 3 R	5/12/33, immediate relief; no complications	11		Free of symptoms to date
30	WFO	60	F	10/94	2 L	Neurectomy in 1919. Pain returned in 1926. Injected 11/22/29, immediate relief; no complications	36	11/28/32, immediate relief; no complications. Reinjected 3/14/33, immediate relief; no complications	Symptoms recently recurred
31	EAK	61	F	5/25	2 & 3 L	5/28/30, partial relief; reinjected 6/6/30, immediate relief; no complications	27	9/3/32, immediate relief; no complications. Reinjected 7/4/33, immediate relief	Free of symptoms to date
32	RSS	77	F	1/21	2 & 3 L	1/30/29, immediate relief; no complications	12	11/8/32, immediate relief; no complications. Reinjected 11/18/33, immediate relief	Free of symptoms to date
33	WMT	37	F	5/27	2 & 3 R	7/11/29, immediate relief; no complications	36	8/7/32, immediate relief. Reinjected 11/9/33, immediate relief; no complications	Free of symptoms to date

RESULTS OF ALCOHOL INJECTION IN 40 CASES OF TRIGEMINAL NEURALGIA

Case Number	Patient's Initials	Age	Sex	Onset of Symptoms	Branch Involved	Date of First Injection, Results and Complications	Period of Relief in Mos.	Date of Second and Subsequent Injections. Results and Complications	Present Status of Patient
34	CCS	67	M	3/26	1 & 2 R	2/6/29, no relief until 3/22/29, then complete.	9	12/24/29, immediate relief. Reinjected 6/14/30, immediate relief. Reinjected 4/16/31, immediate relief. Reinjected 9/12/32, partial relief. Reinjected 11/14/32, immediate relief. Reinjected 6/9/33, immediate relief; no complications.	Symptoms recently returned
35	JMP	68	F	1/27	3 R	4/11/30, partial relief. Reinjected 5/16/30, immediate relief; no complications	36	6/12/33, immediate relief; no complications	Free of symptoms to date
36	SD	47	M	9/26	3 L	5/7/29, partial relief until 6/29, then complete	48	7/8/33, immediate relief; no complications	Free of symptoms to date
37	JLD	60	F	5/23	3 R	1/13/26, immediate relief; no complications	27	4/2/28, immediate relief. Reinjected 5/3/30, immediate relief. Reinjected 2/17/32, immediate relief. Reinjected 9/12/33, immediate relief; no complications	Free of symptoms to date
38	WHP	65	M	4/27	3 R	6/19/31, slow in obtaining relief, but finally complete; no complications	14	9/26/33, slight relief of pain, never complete	10/33, avulsion of sensory root with permanent relief
39	SBD	76	F	2/29	1 & 3 R	2/18/33, immediate relief; no complications	12	3/1/34, immediate relief. Moderate edema of eyelid and slight conjunctival injection. Subsided within 48 hrs	Free of symptoms to date
40	WFJ	66	F	11/28	1 & 2 R	8/24/30, immediate relief; no complications	17	1/2/32, immediate relief. Right eye swollen, edematous and discolored. Subsided in 72 hours. Reinjected 2/2/33, immediate relief. Reinjected 12/18/33, relief immediately; no complications	Free of symptoms to date

hemorrhage, and fibrosis of the pterygoid muscle. Moderate edema of the eyelids with slight conjunctival injection, occurring in two patients, were the only complications observed in this series. Symptoms subsided within two to three days following local treatment. In the majority of cases relief of symptoms was obtained immediately following injection. The average duration of relief from the first injection was 17 months, the shortest period being two months, and the longest 84 months. The second and subsequent injections, in most instances, failed to produce relief of symptoms for this length of time, the average in this group being approximately 12 months. One reason for this is probably the increased difficulty in accurately injecting a nerve previously traumatized and fibrosed. At times, also, there seems to be a widening of the foramina due to some osteoporotic change in their margins. In these enlarged openings the nerve fibers may be spread out or difficult to locate. Harris found that complete relief was obtained for approximately 20 months from the first injection, and that following the second and subsequent injection the period of relief was materially reduced. Grant, Cushing, Frazier, Adson and others in their series have reported practically the same results. As far as I have been able to ascertain, the literature contains no reports of permanent cure following alcohol injections.

CONCLUSIONS

(1) One hundred and fifty cases of paroxysmal trigeminal neuralgia treated by alcohol injections are reported.

(2) Histories and late results in forty cases are summarized.

(3) Average duration of relief was 17 months

following the first injection, and 12 months following the second and subsequent injections.

(4) Alcohol injection should be offered as a means of temporary relief of pain for patients who are unwilling or unable to have section of the sensory root done for permanent relief.

BIBLIOGRAPHY

Dandy, W. E.: Lewis's System of Surgery, 1932.
Pitres and Verger: Soc. de Med. et Chir. de Bordeaux, July 25, 1902.
Schlosser: Ztsche f. Augenh., **10**:335, 1903.
Cushing: J.A.M.A., **75**:443, 1920.
Grant: J.A.M.A, **78**:794, 1922.
Harris: The Lancet, **2**:122, July 15, 1922.
Adson: Jour. Iowa Med. Soc., **14**:17, 1924.
Frazier: Amer. Jour. Med. Sci., **169**:469, 1925.
Grant: J.A.M.A., **78**:1780, 1922.
Frazier: Ann. Otol., Rhinol. & Laryngol., 30:855, 1921.
Adson: Jour. Iowa Med. Soc., **14**:17, 1924.
Adson: Jour. Iowa Med. Soc., **14**:17, 1924.
Harris: The Lancet, **2**:122, July 15, 1922.
Grant: J.A.M.A., **78**:794, 1922.
Cushing: J.A.M.A., **75**:441, 1920.
Frazier: Arch. Neurol. & Psychiat., **11**:557, 1924.
Adson: Northwest Med., **22**:156, 1923.

THE THERAPEUTIC VALUE OF STRONG EPINEPHRINE SOLUTIONS*

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My interest in the use of strong solutions of some preparations of epinephrine arose from the work of Carl Hamburger about ten years ago. The ordinary solutions, in the strength of 1:1000 or even more dilute, have long been employed, particularly to secure a bloodless or comparatively bloodless field for operations, and some observations had also been made on the effect of epinephrine in reducing intra-ocular tension and in forcibly dilating the pupil. Instillations in the ordinary manner are not very effective, but when injected under the conjunctiva, or kept in contact with the eye by placing a saturated pledget of cotton under the upper lid, the activity of the drug is greatly increased. In attempting to break an adhesion by epinephrine, the most effective way to use the ordinary solution is to inject it under the conjunctiva as near as possible to the adhesion.

The stronger solutions introduced by Hamburger were of 2 per cent strength. He used a synthetic levorotary tartaric acid alkaloid derived from the suprarenal capsule, which he called "links-glaucosan," the name suggesting its use in glaucoma. This he found to act satisfactorily by instillation; in fact, it is too strong to use by injection. Even in instilling it he advised that the patient lie down, and that an attempt be made to keep the solution from passing into the tear passages. Hamburger advocated the use of glaucosan as an adjuvant to eserine in contracting the pupil and reducing the tension in glaucoma, especially glaucoma simplex. The primary effect of the glaucosan is to dilate the pupil, but it reduces the tension and it is easier thereafter to keep the tension reduced by eserine or pilocarpin, either of which will quickly contract the pupil as the effect of the glaucoma on it wears off. Its occasional use, combined with eserine, is certainly of value. The eserine has to be used continuously, but the glaucosan only at intervals of a week or more. Incidentally, Hamburger noted that the dilatation of the pupil was accomplished to a greater degree by glaucosan than by ordinary mydriatics, even in the presence of an iritis, and when other mydriatics failed to dilate it, or failed to break the adhesions that might be present.

Our experience with this drug has been published, and there seemed to be some advantage in its use in glaucoma, as Hamburger suggested. But because the other treatment had to be continued on account of the temporary effect of the glaucosan, and because no very striking improvement has followed, we are lukewarm as regards its use in glaucoma. An added reason for this feeling is that it occasionally will have the opposite from the desired effect, in that the tension may be raised, and in fact an acute attack of glaucoma brought on, as we have observed at least once.

Of the value of glaucosan in dilating the pupil, however, we can speak in the highest praise. Adhesions of the iris to the lens capsule which resist atropin are usually completely ruptured by the glaucosan drops, unless of course they have existed for some days. Since the tension is at the same time lowered, it is a particularly gratifying drug in iritis with rise of tension, a condition with which we all have to contend too frequently, and which is always a therapeutic problem, since atropin would seem to be contraindicated by the hypertension, and eserine by the iritis. The time is too short to report many cases, so that I can only say that many, many times we have observed the happiest results in dilating apparently undilatable pupils, in rupturing synechias that would not yield to any other measures, and in restoring to perfect functional health eyes that seemed bound to be more or less disabled. Let me repeat the fact that this

*Read in Clinical Session, Texas Ophthalmological and Otolaryngological Society, meeting conjointly with Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

treatment is especially useful in various forms of iritis attended with a secondary rise of tension, in which other treatment is often ineffective and surgery is certainly not indicated. Two cases, illustrative of the good effect of this treatment, are quoted from a paper on this subject written several years ago:

Case 1.—Miss E. S., aged 54 years, a college teacher, came to the office on January 26, 1928, with a history of inflammation in the right eye for eight days. There had been no treatment.

Examination showed all the signs of an advanced iridocyclitis, the posterior corneal surface being almost covered with mutton fat deposits and the aqueous hazy. The pupil was contracted, with practically complete posterior synechias. The vision was reduced to moving objects and unimproved by glasses. The left eye was unaffected.

The administration of six drops of 1 per cent solution of atropin sulphate, combined with hot applications, over the course of an hour, had absolutely no effect on the iris.

One drop of the strong epinephrine solution (levoglaucosan) was followed within five minutes by complete dilatation of the pupil, leaving a ring of pigment spots on the anterior lens capsule to mark the former synechais. There was a good fundus reflex, but no details could be seen.

The patient was admitted to the hospital, atropin and hot applications every four hours were ordered, and a complete physical examination was made, which was entirely negative except for several dead teeth. The next day the pupil was again contracted in spite of the atropin, and a single administration of levoglaucosan caused rapid and wide dilatation.

January 28, four dead teeth were removed. The pupil again tended to contract and levoglaucosan again widened it completely. From this time on there was no further difficulty in maintaining sufficient dilatation with atropin alone, and the patient made a steady convalescence.

February 21, the right eye was white and the pupil was large and round. A few pigment spots were present on the capsule and on the posterior corneal surface. The fundus was normal. Vision was 20/40, improved with +0.50 sph. +0.50 cyl. ax. 135° to 20/20.

Case 2.—Mr. J. A. T., aged 29, engineer, was seen January 3, 1928, with all the signs of acute iritis in the right eye. The eye had been sore for a week. Vision was 20/50. There was practically no dilatation to atropin.

On January 4, he received a subconjunctival injection of atropin and epinephrine, resulting in a slight dilatation of the pupil up and in. Many posterior adhesions were present down and out. That afternoon one drop of the 2 per cent eninephrine solution tore all these adhesions save one and dilated the rest of the pupil widely.

January 5, a subconjunctival injection of two minims of a 1 to 1,000 solution of epinephrine chloride opposite the remaining adhesion resulted in rupture of this synechia. From this time on, atropin controlled the dilatation of the pupil and convalescence was uneventful until complicated on January 18 by an episcleral nodule, which responded to treatment.

February 6, vision O.S. was 20/40, improved with —1 sph. to 20/20.

Levoglaucosan is therapeutically effective to a perfectly satisfactory extent, but there are two or three objections to its use. One is the expense. Glaucosan comes in a box containing ampoules and costs $4.50, or $1.50 an ampoule. Epinephrine bitartrate costs $1.00 an ampoule. Another is the fact that it has to be imported and there is frequently a delay in obtaining it. Incidentally it is of German manufacture, which may prejudice some people against it. Another objection is that it is marketed in solution, and after opening the ampoule the solution becomes discolored, cloudy, and not pleasant to use. To overcome these objections, Dr. John Green has interested American manufacturers in putting out a similar preparation, and there is now available a synthetic epinephrine bitartrate in ampoules each containing 0.091 gram of the drug. This dissolved in 2.5 c. c. of water makes a 2 per cent solution. We have used this preparation with complete satisfaction where we formerly used glaucosan. It keeps well, is easily obtainable, readily prepared, and very efficient.

Since I have a little of my allotted time left, there is another small matter of which I have sought an opportunity to speak for some years, but which is not in itself sufficient for the contents of a paper. It is in regard to the diagnosis in the cases variously described as "congenital abduction deficiency," "retraction movements of the eye," and "deficient abduction with retraction of the eye in adduction." The outstanding sign is deficient external rotation. In older children and adults, the demonstration of this offers no difficulty, but in children of one year or less the patient presents a convergent squint and it is sometimes as difficult as it is important to know whether or not the external rectus muscle functions. Under these circumstances the activity of the muscle can be demonstrated by douching the ear on the side of the muscle in question with very cold water. The outward nystagmic movements will certainly be produced if there is a functioning muscle present, though the test does not enable one to locate the cause of the defect if a defective rotation is present. It may be a lesion of the center or trunk of the sixth nerve, or it may be a congenital absence of the muscle, or the muscle may not be muscle at all, but a fibrous band. Unless the question of whether or not a functioning muscle is present can be settled positively, inappropriate treatment may be advised and carried out.

SOME ASPECTS OF THE ASTHMA PROBLEM*

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Cameron, in answer to his own question, "What do we mean by asthma?" says: "First of all, I wish particularly to differentiate between the term asthma and bronchospasm (the lesser is always contained in the greater)." He then goes on to say that asthma is a syndrome, one of whose characteristics is bronchospasm, which, however, appears last of all and completes that syndrome. Three other factors are required:

(1) Basic toxicosis
(2) Ethmoid implication
(3) Irritable nervous system

This, to my mind, covers the condition much better than does the definition of Todd, who says:

"The name asthma is given to the symptom of dyspnea of paroxysmal type, often showing periodicity and tending especially to affect the expiratory act.

"Asthma is best regarded, not as a disease, but as an aggregate of abnormal reflexes acting upon the bronchi of persons diathetically disposed. Though these two factors are mentioned, both may not be present always, for, experimentally at least, an asthmatic type of dyspnea can be produced by either alone, for example, as in anaphylaxis, by obstructing the anterior nares or by stimulation of parts of the nasal septum."

This definition seems to be more involved and less clearly explanatory than the one quoted of Cameron. For asthma, after all, is an exaggeration of what is a normal reflex, that is, the sneeze reflex, which is always excited by irritation within the nose. The nose always has a role in the true asthma syndrome, and a pathological condition is invariably present in the ethmoid region.

It is possible that the nose alone may be the cause of asthma producing a general toxicosis from infection here. This is unusual and the source of toxicosis is very frequently in other regions. Treatment must be directed at the nose as well as toward the general system to secure a permanently good result.

To have a better understanding of this role, a glance at that part which is at fault in these cases will not be amiss. The middle turbinate portion of the ethmoid projects into the nose. Above the posterior two-thirds of this there is a recess which has opening into it a single ethmoid cell. This recess becomes practically a closed cell when the middle turbinal is so swelled that drainage from this area into the nasal cavity is prevented.

This ethmoid area has its sensory nerve supply from branches of the ophthalmic and superior maxillary divisions of the fifth nerve; there are possibly connecting branches to the sphenopalatine ganglion. Dean W. Myers says:

"Through the sensory root of the trigeminus, by means of collateral neurones of the second order, a synaptic relationship is established with the motor neurones of the vagus nuclei, which send efferent impulses to the musculature of the respiratory passages."

In support and explanation of this synaptic relationship, he quotes the work of Gardinier, of Troy, "Anatomy of the Central Nervous System" (page 158), under the subtitle, "A Motor Nucleus of the Vagus and Glossopharyngeal Nerves."

"About the cells of this nucleus (nucleus ambiguus) exist fine end brushes, probably in part collateral from the descending root of the trigeminal nerve, thus establishing a connection between the fifth nerve and the motor division of the vagus and glossopharyngeal nerves."

In this same connection, Burton Haseltine says:

"The unstriped musculature of the bronchioles is supplied by fibers from the motor nuclei of the vagus, chiefly the dorsal nucleus and the nucleus ambiguus. A peripheral stimulus producing either normal contraction or spasm can be conveyed only by efferent nerves having a deep connection with these nuclei. Except the sensory portion of the vagus itself, the only nerve known to have such a connection is the sensory portion of the trigeminus. The sensory root of the trigeminus, through the gelatinous substance of Rolando, has a synaptic connection with the dorsal vagus nucleus. This is accepted as the arc through which is produced the cough and sneeze reflex from irritation of certain intranasal areas."

W. E. Dixon ("Cause of Bronchial Asthma") made some most elaborate reports on experimental work with nerve stimulation, which he reports in detail. He then says:

"The general conclusions, therefore, are that true bronchial asthma is in all cases a spasmodic contraction of the bronchial muscles; that if it follows or occurs in an acute attack of bronchitis, it has been reflexly produced either from the bronchial mucous membrane or from some other hyperirritable mucous membrane, or possibly from the combined action on the medullary center. * * *

"Having seen that reflex contraction of the bronchioles can be produced, it necessarily follows that we should inquire what is the significance of such reflexes

*Read in Clinical Session, Texas Ophthalmological and Otolaryngological Society, meeting conjointly with Southern Medical Association, Twenty-Eighth Annual Meeting. San Antonio, Texas, November 13-16, 1934.

and what important function do they normally perform which has called them into existence. We have seen that the nasal reflex is the important one, and in considering its normal significance, a study of the other reflexes obtainable from this surface is most valuable. The reflex effects which may be produced from the nasal mucous membrane are cardiac inhibition, dilatation of the peripheral blood vessels, arrest of respiration in the expiratory phase, spasmodic closure of the glottis, coughing, sneezing, and contraction of the bronchial muscles. All these are most easily produced and their obvious meaning is to prevent the entrance of irritating substances, both particulate and molecular, into the respiratory tract. They can all be produced by chemical or mechanical excitation and by blowing finely divided particles into the nostrils. Unquestionably, one of the most effective results for the end in view is the contraction of the bronchial muscles, and this, therefore, appears to be the teleological meaning of the reflex in question. This, too, fully explains the excessive sensitiveness of asthmatic patients to minute changes in the character of the air breathed."

Consideration of the foregoing makes it plain that nasal disease plays a most important part in the asthma complex. The term asthma is used here and hay fever is not used. The reason for this is that while hay fever is a distinct entity, its persistence for a long period will eventuate in what is first called hay asthma and later asthma, coming without any sort of periodicity.

The nose as a factor in every respiratory affection cannot be disregarded, and we must view it with increasing respect, for it stands at the gateway of respiration to prevent the entrance of improperly prepared air into the deep organs of respiration. The color of its mucous membrane has come to be recognized as an index of the character of diet needed to balance the system.

In emphasizing the importance of the nose in this condition, it is not my intention to convey the idea that it alone is responsible for the condition. Such is far from the fact. Asthma is a toxicosis, which, according to Cameron, has most probably affected the liver. This toxicosis is proven by blood, stool and urine examinations, which must be carefully and exactly made.

It seems, in the face of the work of Cameron, Mitchell, LaForge and others, that the allergic theory of asthma is hardly sufficient to explain all the conditions. There is no desire to deny or belittle the allergic findings or results, but in my own opinion, they are all to be finally explained as our knowledge of biochemistry and endocrinology becomes broader and more certain. When this much-to-be-desired goal is reached we shall probably find endocrinology explained in terms of biochemistry.

Dr. Jervey, in a discussion on allergy at a recent section meeting of the American Laryngological, Rhinological and Otological Society, expressed this view so aptly that he was asked by me to write it out, and he is quoted in full:

"This whole question of allergy leaves much to be desired in our understanding. It is my belief that as more and more is learned about it, we shall find that allergy is merely a symptom, not a disease entity or a group of disease entities. Dawning upon the scientific horizon appears the likelihood that the subject is really a phase or manifestation of nutritional deficiency or inefficiency and biochemical imbalance. It seems also likely that the subject of endocrinology will play a major part in the future understanding of what is now referred to as allergy. Take, for instance, the appearance of the intranasal mucosa under varying conditions. Many of the manifestations of these tissues have been regarded as allergic etiologically and symptomatically. We know that these are due fundamentally either to nutritional improprieties which cause morbid activities or changes in the entire cellular structure of the human system, or to the dominance or subjection of the sympathetic nervous system on the one hand, or the subjection or dominance of the parasympathetic system on the other hand. These are what, before long, I believe will be generally recognized as autonomic variations, and the problem before us will take shape as a question of how to maintain the balance between these two great systems of involuntary control (the autonomic level). This can be accomplished only through a knowledge of how to feed and feed properly the endless multiplicity of the cells of the body.

"Also, it is known that there is a close connection, for instance, between, let us say, the suprarenal glands and the sympathetic system. Whether hyperactivity of the sympathetic system through unusual cellular changes stimulates the suprarenal function, or whether something more than the usual cellular stimulus, either through drugs or food or trauma or cerebration (emotion) causes unusual activity of the suprarenal glands, thereby stimulating the sympathetic system into unusual action, seems not yet fully determined, but it is certain that the two activities go hand in hand. Thus it can be shown that a nasal mucosa of intense redness and easy susceptibility to infection is due to a predominance of sympathetic activity and suprarenal hypersecretion. On the other hand, it is now believed positively clinically demonstrated that a pale, thickened, boggy vasoconstricted mucosa is seen in parasympathetic predominance and probably some glandular deficiency. This is the appearance usually seen in so-called "nasal allergy." On the other hand, the normal appearance of the nasal mucosa is an indication of a normal balance of the autonomic level. It may well be realized, therefore, that in the not distant future the appearance of the nasal mucosa will be of as much informative importance in the treatment of human disease, if not more so, than the value of a study of the intraocular structures with the ophthalmoscope. This is a very brief mention of the high-lights pointing to the direction in which the great advances of future medicine will be made."

The fact that there exists nasal abnormality as the irritant factor in asthma hardly justifies the query from the medical research worker,

why, if this condition exists in all asthma, does not every case of abnormality in the ethmoid region produce asthma. A similar query could be made in almost any case of local pathological change which sometimes causes reflexes in other localities and sometimes does not.

Haseltine puts the answer in this way:

"We have, too, the obvious answer to one observation which, though quite inane, is almost sure to be made in any discussion of the nasal factor in asthma, namely, that many people have nasal abnormalities who never have asthma, therefore this cannot be a cause. It is easy to reply that many people carry infection who do not have arthritis, therefore infection cannot cause arthritis.

"But this reply is not adequate. A more categorical answer should be made somewhat as follows: nasal irritation alone cannot cause bronchospasm. If the neurophysiological balance is normal, probably any amount of nasal disease can be borne without this symptom. Conversely, general toxicosis alone cannot cause bronchospasm. A patient may be asthmatic in the sense of having many of the associated symptoms, but without a special irritation which reaches the vagus through one of the normal reflex tracts, he probably will not have bronchospasm."

From the foregoing it is readily seen that it is not possible to view the treatment of asthma from any one aspect. In the first place, it should be emphasized that it is a most individualistic condition, and each patient must be looked upon as a personality to be cured, and we must not think of a definite disease that has seized a person.

Every facility of diagnosis within our power should be used to determine the location of the underlying factor in the toxicosis, and, for this, appropriate treatment should be given. This search may be long, but it must be made if a final good result from treatment is to be obtained. The pathologic condition may be found in any part of the body, and the special worker in any line may have to be called in to correct the condition found. Pus tubes, infected genitourinary tract, gallbladder disease or an infected appendix are just a few of the conditions that have been found to be the underlying factors of the toxicosis in asthma sufferers. Nasal treatment is an absolute essential to be undertaken along with the general treatment. Either form of treatment (general or nasal) has been known to relieve some cases, but the patient is not cured unless both are done, and he is as nearly restored to a normal balance as it is possible for him to obtain.

The nasal disease found will usually be in the ethmoid region. If surgery is indicated, the operation should bring about sufficient aeration and drainage of this region, but it should be only such an operative procedure as would be used in the same individual if he presented himself for treatment and did not have asthma. In other words, do not use destructive surgery just because you have an asthmatic patient with a certain amount of nasal abnormality.

Along with such nasal surgery as may be necessary to restore normal function should be used tampons of colloidal silver. In case of the need of surgery it is frequently wise to use these tampons for a few days before operating, in order that the engorged mucous membrane may be brought to a more normal condition. If surgery is not indicated, the tampons should be used. The tampons should be very gently and carefull introduced, but the area must be thoroughly treated. The recess above the middle turbinal must be filled and the tampons should cover the middle turbinal and the interior of the nasal chamber with the exception of the floor. No medication of the nasal chambers should be used prior to the insertion of the tampons unless a gentle saline irrigation is desired.

These tampons should be left in place from thirty to sixty minutes and replaced every twenty-four hours. The improvement in the condition of the nose will be noted often after the first application. In children a wick of cotton may be inserted into the anterior naris and on this dropped a few drops of the silver solution every five minutes for five or six applications. After they realize that the use of the tampons is without pain or discomfort to them they will frequently submit to them without protest.

Asthma, as the most distressing symptom of a profound systemic aberration, can be greatly relieved or cured if approached as a problem of general toxicosis and if every method is used to clear up this systemic imbalance.

Endocrine abnormalities and every departure from normal physiological balance must be looked into and corrected and the diet and habits regulated. When this is done the result will be gratifying. As final emphasis, the conclusion of a paper by Dean W. Myers may be quoted:

"In conclusion, it should not be forgotten that the rhinologist's function is to remove from the nose any source of infection which may be responsible for the toxicosis of the patient or any cause of irritation to the sensory nerve fibers of the trigeminus. A clear understanding of the relationship between the nose and the nerve paths leading to the bronchial musculature and the hypersensitive state of all sensory nerve tissue because of the toxicosis will result in more intelligent

handling of these cases. The great mistake has been that rhinologists have tried to meet the problem single-handed, or that the internist has tried to relieve his patient unaided by the rhinologist. In the light of the experiences recorded by Adam, of Scotland, Haseltine and LaForge, of this country, and many others, it must be clear to thinking men that only by closest cooperation between internists and rhinologists can satisfactory results be obtained."

BIBLIOGRAPHY

Lake, George B.; Haseltine, Burton; LaForge, Alvin; Cameron, A. J. D.; Mitchell, Clifford; Dixon, W. E.; and Adams, James: Symposium on Asthma. Med. Jour. & Rec., Nov. 6 and 20, 1929.
Cameron, A. J. D.: Some Thoughts on Asthma. London, 1933.
Jervey, J. W.: personal communication.
Todd, A. T.: Routine Treatment of Asthma. Practitioner, **131**: 168, Aug., 1933.

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ALLERGIC PURPURA*

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The similarity of the reactions occurring in some instances of anaphylaxis and serum sickness,[1 2 3] with the symptoms of a group of clinical conditions in which purpura is a presenting symptom, has led to the hypothesis that the allergic state might be the etiologic factor for these conditions. Clinically, these conditions include the Schonlein-Henoch group and the Osler erythema group with visceral manifestations. Osler[4] reported many cases and not only called attention to the changeable nature of the skin lesions and the variability of the presenting symptoms, but also suggested that anaphylaxis would explain the etiology. Frank[5] considered these cases as anaphylactoid phenomena. Glanzmann[6] considered most purpuras, except the idiopathic and symptomatic hemorrhagic purpura, as being of that nature and upon a basis of infection. He identified no specific bacterial agent, but believed that the foreign protein formed during the bacterial infections acted as capillary poisons.

Clinically, it has been possible to identify cases of Henoch's syndrome with infection. Bradburn[7] reports a case of Henoch's purpura in which all symptoms disappeared after the eradication of oral sepsis. Coke[8] reports two instances of abdominal symptoms and purpura coincident with acute infection. In one, administration of an autogenous vaccine was followed on the fourth day by purpura and albuminuria without abdominal symptoms; the other cleared upon drainage of an otitis media. Kugelmass[9] reports instances in which the removal of foci of infection cured Henoch's syndrome.

Hypersensitivity to food resulting in purpura was reported by Duke[10] in a woman sensitive to rice, beef, milk and egg. The deliberate eating of rice while under his observation was shortly followed by nausea and vomiting, to be followed later by urticaria, angioneurotic edema and subcutaneous hemorrhages. Landsberger[11] reported a two-months'-old infant in whom the ingestion of cow's milk produced edema about the eyes, urticaria, and purpura. Alexander and Eyermann[12] have observed nine cases of Henoch's purpura due to food ingestion. Kahn,[13] Barthelme[14] and also Bray[15] have reported cases of Henoch's purpura in which it was possible to induce purpura and other associated symptoms of Henoch's purpura by ingestion of specific foods.

Our present conception of the pathology of allergy does not explain the escape of red blood cells into the tissues. However, Schwartzman[16] and others[17 18] have found that hemorrhagic reactions occur in skin areas of rabbits, prepared by intradermal injection of bacteria upon intravenous injection of heterophile substances. Sanarelli[19] was able to produce hemorrhagic or desquamating enteritis in rabbits which were carriers of cholera vibrios by injecting alien bacterial products intravenously. While these experiments refute our belief in the specificity of allergic reactions, they do indicate a mechanism by which certain clinical phenomena may be produced.

Whether the purpura and associated symptoms appear to be induced by infection, or by ingestion, or by inhalation, the common factor appears to be a disorder of the capillary mechanism which leads to congestion, exudation or hemorrhage. This leads to a variety of skin lesions such as erythema, urticaria, angioneurotic edema, and purpura; exudations into the stomach or intestinal walls which cause nausea, vomiting, or abdominal colic. Hematemesis, frank intestinal hemorrhage, or bloody diarrhea will occur as the result of the escape of blood and serum into the stomach or intestinal lumen. Focal hemorrhage in the kidney results in hematuria and kidney colic may occur during efforts to expel clotted blood from the kidney pelvis. Nephritis may develop, perhaps complicated by anuria, and may

*Read in Allergy Clinic and Round Table, meeting conjointly with Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

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progress to uremia. Exudates into or about the joints, most frequently of the knees and ankles, lead to arthralgia simulating arthritis.

With the present methods of examination, the blood chemistry is normal; the bleeding and coagulation time and clot retraction phenomenon are within normal limits. Usually the number of blood platelets is not decreased. A secondary anemia from blood loss occurs rarely and only slight blood eosinophilia and leukocytosis has been observed in the occasional case.

It has been possible to observe eighteen patients in whom purpura followed the deliberate ingestion of food. Of these, five had positive family histories for allergy; two had collaterals with allergic manifestations without such a hereditary influence; five had no allergic manifestations and the remainder (six) gave an unreliable history of these diseases in the antecedents.

Positive skin tests were present in ten patients and absent in eight. The positive skin tests indicated the offending food in six instances and their etiologic significance could not be shown in the remainder.

The most frequent associated allergic manifestations were headache, nonseasonal vasomotor rhinitis, urticaria, bronchial asthma, angio edema, eczema, hay fever, and drug idiosyncrasy. Five patients had no associated allergic manifestations.

Purpura more often followed the eating of egg, milk, wheat, chocolate, beef, potato, oatmeal, string beans, and pork in that order of frequency. Chicken, corn, ginger, apple, grape, pear, carrot, lettuce, plum, tomato, strawberry, peanut, walnut, and spiced foods in which it was impossible to determine the specific offender, were also etiologic foods.

One food was followed by purpura in six patients; two foods in eight patients, and three foods in four patients.

It seems desirable to present some of these cases in detail in order to illustrate the phases of the clinical problem in those cases due to the ingestion of food.

The following three cases have been observed for several years. The first two are noteworthy because the recognition of the allergic state explained a multiplicity of symptoms and all three because of the persistence of their allergic state. In two of them, the purpura occurs without abdominal pain.

Case 1.—In 1919, there came under my observation a married woman of 30 years complaining of disabling headache occurring as often as once a week and not associated with the menstrual periods. The history brought out that as incidental symptoms she had frequent sore throat usually associated with abdominal pain and also that purple spots frequently appeared on the arms and legs. These latter were thought to be due to bruising of which the patient usually was not aware and they often occurred in places that would be difficult to traumatize. The sore throat occurred without fever and consisted of painful deglutition. The abdominal pain was colicky, situated usually about the umbilicus, not disabling and relieved by the application of heat and the passage of flatus. Aside from tonsils, which were thought to be chronically infected, and several apical abscesses, the physical examination was negative.

In the course of the next two years the tonsils were removed and all apical abscesses drained. The headaches, abdominal pains, sore throats, and purpura persisted.

It was noted that during a headache the facial features were smoothed out and that the hands and feet were slightly edematous. The patient then volunteered the statement that during some of the severe headaches it was necessary for comfort to remove her rings and remove her shoes on account of swelling. Later it was determined that she gained five to seven pounds during a period of headache, which was rapidly lost upon its subsidence. Soon thereafter, I became aware that the sore throats, which unfortunately had not been bettered by the tonsillectomy, were associated with a moderately edematous tongue; and allergy as cause of all her symptoms was considered.

A review of her history developed that the knowledge of illnesses in the antecedents was vague, neither confirming nor invalidating the existence of allergy. An older sister had hay fever complicated by asthma (in subsequent years I have seen another older sister with angio-edema). Cutaneous tests by the cut and intracutaneous method were negative. There was no blood eosinophilia. Pursuing the concept further, she was asked to follow our routine elimination diet (avoiding milk, egg, wheat, uncooked foods, chocolate, nuts, fish, spices, and condiments) and to keep a dietetic diary. As the result of dietary manipulations, it was found that egg, chicken, beans, fish, and lamb invariably induced abdominal pain and headaches. Furthermore, the ingestion of egg, chicken and beans was consistently followed by the development of purpuric spots, varying from a few millimeters to several centimeters in diameter. These occurred on the arms and legs particularly, and developed within twelve hours after the causative foods were taken. These spots were preceded by a local soreness, so that the patient could thereby predict the site of the ensuing purpura. This was at times associated with abdominal pain, but also occurred without other associated lesions. The induction of symptoms, sore throat, headache, colic, or purpura, could be brought on by exceedingly small amounts of the food implicated and have been produced by a single bean or the amount of egg in one tablespoonful of soup, a pot of which contained one egg. Avoidance of offending foods brought relief of symptoms.

It has been possible to observe this patient up to the present time with intelligent and sincere cooperation. Oral desensitization has not been successful. She remains as sensitive as she was. She has not "outgrown" her allergy.

Case 2.—A single woman of 37 years was seen in the spring of 1927 with dermatitis of elbow and knee folds and behind the ears. In her past history there was an idiosyncrasy to acetylsalicylic acid, which caused severe headache and chest oppression, and to onion, the eating of which caused nausea followed by vomiting; frequent disabling headaches, sometimes associated with nasal blocking and rhinorrhea and a tendency to "bruising" in protected places. These latter were not associated with abdominal discomfort. There were also periods of chest oppression, not requiring medical relief, but of sufficient severity to make such efforts as stair climbing and walking difficult. During these periods she was conscious of rapid heart action which she had counted to be at the rate of 120 per minute. Coincident with the episodes of headache or nasal blocking, she also had noted that her feet were swollen so that she did not feel comfortable when wearing her usual size shoe. She also was subject to car sickness. While all of these symptoms had been present as long as she could remember, they were much more frequent and perhaps severer during the past few years, which was coincident with an attempt to gain weight by increasing the amount of milk in her diet, at the behest of her physician. She had been dubbed a hypochondriac and it was hoped that she would have less complaint if her nutritional status were improved.

There was a history of pulmonary and meningeal tuberculosis in two members of her immediate family; the only allergic manifestation was in her maternal grandmother, in whom honey invariably caused nausea, vomiting, abdominal pain, and sometimes urticaria. She was the only one of five children to have allergic manifestations.

She was a small boned, poorly muscled woman (this build was similar to that of other females in the family), weighing 89 pounds, who gave the impression of undernutrition. Except for the presenting dermatitis, there were no other gross abnormalities. Skin tests for allergy were negative. The dietetic history showed that the dermatitis was coincident with the eating of large amounts of rhubarb over a period of several days, and that milk was taken in larger quantities than was customary for her in the attempt to gain weight. The dermatitis disappeared without any other treatment than the elimination of rhubarb and milk from the diet.

Observations up to the present time have shown that milk will produce headache, not always associated with purpura nor with severe nasal blocking. These latter occur with some feedings of milk and it is thought that quantity is the factor upon which the occurrence of severe nasal blocking and purpura depend. Chest oppression also occurs with some of the reactions. She also has the reaction of headache, frequently with purpura, after the ingestion of spiced sauces, particularly Lee & Perrin's worcester sauce and chili sauce. The exact spice or condiment has not been determined. Very recently, a severe headache and purpura followed the deliberate drinking of a glass of milk. The absence of abdominal symptoms in this patient removes her from the classification of Henoch's purpura. Nevertheless, the purpura with the existing clinical evidence can be classed as an allergic phenomenon. She is no longer a hypochondriac.

Case 3.—In another patient seen in 1930, a married women aged 28 years, with nonseasonal vasomotor rhinitis and quarter sized purpura upon the arms, legs, chest and abdomen, urticaria following the ingestion of strawberries, severe headaches with nausea and vomiting and not associated with the menses, it was possible to induce the purpura with the ingestion of ginger and chocolate. No chocolate was eaten until recently, a period of abstinence of four years. The purpura occurred within twelve hours.

In the following two cases, it required several sequential doses of the food to reproduce the purpura. In addition, the first case emphasizes the allergic character of the disease by the variability of the manifestations with the abeyance of one while the other is active. Both cases illustrate that positive skin tests do not necessarily indicate the etiologic allergen.

Case 4.—A youth of 8 years was seen during the latter part of 1930, complaining of nonseasonal nasal blocking and discharge, which had existed for many years. Frontal and vertex headache occurred frequently and it was thought to be present at the time the nasal blocking was the greatest. Recently, for the first time, he began having abdominal pain without diarrhea. Two days previous to the consultation he had severer pain in the right upper abdomen, which was relieved by the vomiting of mucus and all of the food previously eaten. This was the second such episode since he had been having abdominal pain. This severer attack of abdominal pain was followed by purpura of the legs, up to dime size. Purpura had occurred previously, but his parents were unable to connect it with the previous severe attack of abdominal pain.

There were no definite allergic manifestations in his past history. A facial eczema had been present while he was on a diet of forced feedings following double pneumonia at the age of 2 years. This is the only event from which one would suspect the allergic constitution. An older brother has urticaria and frequent sneezing. The father, who is a taxidermist, has eczema about the fingers (probably occupational). The mother had frequent urticaria as a child and is subject to migrainoid headaches.

Except for the remains of purpura on the lower extremities, the physical examination was essentially negative.

By the intracutaneous method positive reactions were obtained to pyrethrum and suggestively positive reactions were obtained to milk, wheat, chocolate, peach, and orange.

As far as could be determined by deliberate feedings, these foods did not produce the abdominal pain or purpura. Beef and strawberries were suspected from the dietetic diary. The deliberate feeding of beef was followed by abdominal pain without purpura. After the beef had been eaten for several days, purpura developed. The first feeding of uncooked strawberries was followed only by abdominal discomfort of short duration. They were eaten again three hours later and in three hours severe abdominal pain developed and the purpura was present upon awakening the next morning.

This boy has been seen recently for an itching dermatitis of the dorsum of the foot and about the ankles. He has followed no particular diet except perhaps that he has eaten less of beef and strawberries. The dermatitis improves when beef is taken out of his diet and

recurs when it is eaten. During the period of dermatitis he has had neither abdominal pain nor purpura.

Case 5.—A 16-year old girl entered the Barnes Hospital March 29, 1934, with the history that two months previously she had had a period of agonizing pain about the umbilicus extending to both lower quadrants with vomiting and diarrhea; the vomitus and loose stools containing bright red blood. The succeeding day the knee joints were swollen and tender and a papular rash was present on both lower extremities. The abdominal pain followed by a few hours the eating of a pork sandwich. The patient laid considerable stress upon a kick in the lower abdomen which produced only momentary pain and which preceded the acute abdominal episode by two days. One week later a similar attack occurred and since then they have occurred more frequently and without regularity. They have always been associated with loose bowel movements, some of which were streaked with bright red blood. She was not certain that blood was present each time she vomited. The past history was negative and she had had no manifestations of allergy. There were no allergic manifestations in the antecedents. Physical examination revealed essentially a soft, non-tender abdomen without palpable masses or organs, a generalized tenderness of both legs and of lesser degree of both thighs and numerous small maculopapules of brownish color, especially about the popliteal spaces. The largest of these was 3 cm. by 3 cm. Punctate hemorrhages were seen by proctoscopic examination. Tests for hypersensitiveness by the intracutaneous method gave positive reactions to milk, wheat, chocolate, beef, pork, and house dust. The Kahn reaction was negative; the blood sugar was 75 mg. per 100 c. c.; the nonprotein nitrogen was 33 mg. per 100 c. c.; negative guaiac in stool; the white blood cell count was 9,100; the red blood cell count was 5,270,000 and 4,080,000 upon a later occasion; blood platelets were 385,000; the hemoglobin was 71 per cent; blood eosinophils 1 per cent; clotting time was 13 minutes (Howell method); bleeding time, 6 minutes (Howell method); the urine was negative.

The deliberate ingestion of three quarts of milk over a period of two days was not followed by any symptoms. One pork chop was eaten for three sequential meals. There was some abdominal discomfort after each, but after the third there followed nausea, vomiting (vomitus did not contain blood) and purpura of the legs and thighs. Subsequent observation discloses that each time she eats pork she has abdominal discomfort and that purpura does not follow each one of these periods of abdominal pain. From the clinical experience while in the hospital, the purpura in this case developed only after a sufficient dose of the allergen had been ingested. Of interest also is, that at her most recent visit to the clinic she had a typical contact dermatitis, the etiology of which has not as yet been ascertained.

In the following case the purpura was induced by inhalation as well as by ingestion; the skin tests did not give the etiologic diagnosis. I have the privilege of reporting this case through the courtesy of Dr. Harry L. Alexander, who directed the observations while in the Barnes Hospital, and of Dr. C. M. Stroud, who continued the observations on the allergic factor through his clinic at the Barnard Free Skin and Cancer Hospital, and who observed her recently in order to check the previous observations.

Case 6.—An unmarried woman of 19 years, who worked in a tobacco factory, entered the Barnes Hospital May 28, 1931, from Dr. Stroud's clinic at the Barnard Free Skin and Cancer Hospital with purpura on both legs and edema about the ankles of two weeks' duration. No history of allergic manifestations in the antecedents was obtained. Detailed questioning elicited that the patient was nauseated after the ingestion of milk, and for that reason avoided it as much as possible. The appendix had been removed three years previously because of periods of abdominal pain, but no abdominal pain was associated with the purpura.

Except for the purpura from 1 to 10 mm. in size, irregularly scattered over both legs from ankles to thighs, the physical examination was essentially negative. The Wassermann reaction was negative; the hemoglobin 70 per cent; red blood cells, 4,160,000; white blood cells, 9,000; blood eosinophilia, 9 per cent. At another time the white blood cells were 6,100 with a blood eosinophilia of 16 per cent. The bleeding time was 1½ minutes (Howell method); coagulation time, 13 to 15 minutes (Howell method); the blood platelets were 324,000. A nose bleed occurred while she was in the hospital, which came from a dime sized depressed ulcer of the left anterior cartilaginous portion of the septum. Tests for hypersensitiveness by the intracutaneous method gave a two plus reaction to feathers, a one plus reaction to orris root, a plus minus reaction to egg and rye, and a negative reaction to milk upon the arm, calf, and thigh.

The purpura disappeared coincident with the institution of the routine elimination diet (milk, egg, wheat, chocolate, nuts, fish, spices, condiments, and uncooked foods). Purpura followed the deliberate ingestion of milk upon six different occasions. Abdominal pain did not occur. Pain in the ankle occurred during one of these deliberately induced episodes of purpura. The deliberate ingestion of the foods giving plus minus reactions was not followed by allergic manifestations. While on a milk-free diet, in order to determine whether her work had any influence upon her affliction, she duplicated in the hospital her work with tobacco. Purpura occurred after three hours.

She was later observed by Dr. Stroud, under controlled conditions in the Barnard Free Skin and Cancer Hospital, who repeated these observations and obtained similar results. The recent follow-up discloses that she is very well and has had no purpura. She uses no raw milk and is doing her usual work at the factory, but only part time.

The absence of purpura can be accounted for by the abstinence from raw milk and the lessened amount of contact with tobacco. It is probably an instance of a smaller total allergic dose.[20]

In most instances purpura, of allergic origin due to food, is identified by the same criteria by which other allergic manifestations are recognized, namely: the occurrence of allergic manifestations in the antecedents or collaterals and in the patient, eosinophilia, and positive skin tests. The latter do not always indicate the offending substances, but merely indicate the existence of the allergic state.

One obtains additional help in the diagnosis from the character of past or present skin lesions and the history of past or present visceral crises and joint pains. As a rule, they do not show thrombocytopenia.

However, a decreased platelet count, which many consider the diagnostic point which differentiates the two types of purpura, need not rule out allergy. The recent clinical observation of Loewy,[21] whose case of thrombocytopenic purpura was due to the ingestion of a hypnotic, "sedormid," and of Peshkin and Miller,[22] who were able to demonstrate hypersensitivity to quinine and ergot in a case of essential thrombocytopenic purpura, and of others, suggests that purpura associated with thrombocytopenia may be on an allergic basis. In these cases the symptoms were not due to overdose or cumulative action of the drug, but apparently to an allergotoxic reaction[21] from a small dose.

The cases with abdominal pain not associated with purpura or other allergic manifestations at the time of the initial examination present the greatest difficulties in diagnosis. Some have leukocytosis, fever and rigidity of the abdominal muscles,[23] thus mimicking intra-abdominal conditions requiring surgical intervention. The abdominal symptoms may be due to intussusception with actual obstruction necessitating prompt surgical interference when it is clear that one is dealing with an allergic manifestation. It is not always easy to decide upon the proper therapeutic procedure, but to avoid unnecessary operations the decision should not rest solely upon the abdominal symptoms.

The accumulating clinical evidence points to the fact that allergy will explain a great number of the cases classified as Schonlein-Henoch's purpura or the erythema group of diseases with visceral manifestations. There is no one diagnostic procedure which will identify these cases as allergic, but a good history is of the greatest assistance. The clinical recognition of allergic purpura depends upon our ability to recognize the fundamental state which we call allergy.

BIBLIOGRAPHY

1. Widmer, H.: On the Occurrence of Purpura Simplex in Serum Sickness. Med. Klin., **13**:1041, 1917.
   Intestinal Manifestations of Serum Sickness. Deutsch. Arch. f. klin. Med., **125**:51, 1918.
2. Meleney, H. E.: A Case of Purpura During Serum Disease. Amer. Jour. Med. Sci., **159**:555, 1920.
3. Rackemann, F. M.; Longcope, W. T.; and Peters, J. P.: The Excretion of Chlorides and Water and the Renal Function in Serum Sickness. Arch. Int. Med., **18**:496, 1916.
4. Osler, W.: The Visceral Lesions of Purpura and Allied Conditions. Brit. Med. Jour., **1**:517, 1914.
5. Frank, E.: Die Essentielle Thrombopenie (Konstitutionelle Purpura-Pseudo-Kamophilie). Berl. klin. Wchnschr., **52**:454, 1915.
6. Glanzmann, E.: Contribution to the Recognition of Purpura During Childhood. Jahrb. f. Kinderh., **83**:271, 1916.
   The Conception of Anaphylactoide Purpura. Jahrb. f. Kinderh., **91**:391, 1920.
7. Bradburn, T. S.: Oral Sepsis Simulating Henoch's Purpura. Brit. Med. Jour., **1**:525, 1914.
8. Coke, H.: Two Interesting Cases of Henoch's Purpura. Brit. Med. Jour., **1**:535, 1931.
9. Kugelmass, N.: Clinical Control of Chronic Hemorrhagic State in Childhood. J.A.M.A., **102**:281, 1934.
10. Duke, W. W.: Food Allergy as a Cause of Abdominal Pain. Arch. Int. Med., **28**:151, 1921.
11. Landsberger, M.: Allergy to Cow's Milk in Infant with Purpura. Ztschr. f. Kinderh., **39**:569, 1925.
12. Alexander, H. L.; and Eyermann, C. H.: Food Allergy in Henoch's Purpura. Arch. Dermat. & Syph., **16**:332, 1927.
    Allergic Purpura. J.A.M.A., **92**:2092, 1929.
13. Kahn, I. S.: Henoch's Purpura Due to Food Allergy. Jour. Lab. & Clin. Med., **14**:835, 1929.
14. Barthelme, F. L.: Allergic Purpura (Henoch's). Jour. Allergy, **1**:170, 1930.
15. Bray, G. W.: Recent Advances in Allergy. Philadelphia: P. Blakiston's Son & Co., Inc., 1931.
16. Schwartzman, G.: Jour. Exper. Med., **54**:1, 1931.
    Jour. Exper. Med., **56**:291-687, 1932.
    Jour. Exper. Med., **57**:857, 1933.
17. Sickles, G.: Local Skin Reactions Obtained by Intravenous Injection of Agar Following Intracutaneous Inoculation of Meningococcus Toxin. Jour. Immunol., **20**:169, 1931.
18. Freund, J.; and Smith, W. F., Jr.: Proc. Soc. Exper. Biol. & Med., **31**:1104, 1934.
19. Sanarelli, G.: Experimental Cholera. Ann. de l'Inst. Pasteur, **38**:11, 1924.
20. Eyermann, C. H.: Food Allergy as the Cause of Nasal Symptoms. J.A.M.A., **91**:312, 1928.
    Food Allergy and Nasal Symptoms. Jour. Allergy, **1**:350, 1930.
21. Loewy, F. E.: Thrombopenic Hemorrhagic Purpura. Lancet, **1**:845, 1934.
22. Peshkin, M. M.; and Miller, J. A.: Quinine and Ergot Allergy and Thrombocytopenic Purpura. J.A.M.A., **102**:1737, 1934.
23. Gay, L. P.: Allergy in Internal Medicine: The Acute Allergic Abdomen. Jour. Mo. State Med. Assn., **31**:385, 1934.

SOME PHASES OF THE CONDUCT OF LABOR*

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A sagittal section of the non-pregnant uterus in the normal adult reveals a striking difference in depth of the anterior and posterior fornices. The lumen of the posterior fornix lies directly opposite the anterior reflexion of the peritoneum, which passes posteriorly over the uterus into the cul-de-sac. This relationship is constant throughout pregnancy, labor and the puerperium provided no trauma or infection has occurred. Anteriorly the vaginal fornix and the peritoneal reflexion are widely separated, the bladder coming close to the superior end of the cervix and being held on its inferior surface by the pubo-vesico-cervical segment of the superior plane of the fascia endopelvina. It is the partial or total destruction of this fascial plane in labor which permits the bladder to sag down until it overlies the whole

*Read in General Clinical Session, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

anterior surface of the cervix, more or less obliterating the anterior vaginal fornix.

The cervical canal is spindle-shaped, the external os and internal os each measuring 4 mm. in diameter, while the widest part of the lumen measures 7 mm. At the junction between cervix and corpus uteri there is a zone 8 mm. in length known as the isthmus uteri. It is this zone which softens first in response to the hyperemia of early pregnancy and gives rise to the Hegar sign.

Even more important, this segment of the uterus becomes the basis of the lower uterine segment in late pregnancy and labor into which the substance of the cervix is merged by the downward canalization of the cervix during the process of effacement. The lower uterine segment, when fully developed, is thus revealed as a thin-walled appendage to the contractile portion of the corpus uteri. It is well known that the fetal head finds accommodation in this lower uterine segment in late pregnancy and throughout the first stage of labor. It is conceivable that the division of the uterus into a contractile portion and this lower non-contractile compartment is planned as a refuge for the fetal head, which is thus further protected against compression trauma during the hours of effacement and dilatation of the cervix.

The cervix seen in sagittal section at full term is a tremendously vascular structure. It is likewise the seat of an extensive lymphatic circulation. The vessels, both vascular and lymphatic, find their ingress and egress through the parametrial supportive structures of the uterus, namely, the bases of the broad ligaments and the uterosacral ligaments. The readiness with which the cervix is disposed of in the first stage of labor is directly proportional to two factors: the forces of the uterine contractions applied either through the intact membranes or the presenting part when the membranes have ruptured, and its own vascularity. The strictures of preexisting inflammation as well as the scars of previous injury are responsible for many a delayed first stage of labor.

A word as to effacement and dilatation. In general, the two processes go on simultaneously. Effacement is considered complete when the vagino-cervical angle has disappeared, that is, when the teat-like protrusion of the cervix has become a flush surface. When this has occurred there is no longer a cervical canal as such. Whether the cervical margin be thick or tissue paper thin it is safe to say that when dilatation of the external os has reached a diameter of 4 cm. or more, effacement is complete. Clinically, this is of the greatest significance in the mutiparae in whom the remainder of the dilating process may proceed with startling rapidity, resulting in the appearance of the head at the vulva within a very few minutes after such a partial dilatation has been diagnosed. For the obstetrician, this means that it is unwise to leave a multipara in active labor in whom effacement is completed and dilatation on its way.

Rupture of the membranes which ordinarily occurs at the end of complete dilatation, but which may be the first evidence of the onset of labor has been again advocated as a safe and simple method for the induction of labor. There can be no question about its efficacy in a majority of instances. In competition with other methods of induction such as a stripping of the membranes from the lower uterine segment combined with two ounces of castor oil by mouth and, if desired., one minim doses of pituitary substance hypodermically at thirty-minute intervals for eight or ten doses, rupture of the membranes involves a double risk: first, that labor may be slow in coming on and prove to be unduly long; and second, that this delay may lead to invasion of the uterine cavity by pathogenic organisms which may be present in the vagina. Such patients develop fever, a foul-smelling discharge and make one wish that the rupture of the membranes had been left to the natural forces.

The cervix sustains some injury in every labor; usually that injury consists in a thinning out of the lateral segments of the cervix and a corresponding thickening of the anterior and posterior lips. Such a cervix examined immediately after expulsion of the fetus hangs loosely in the vagina and seems to be extremely thin laterally. One or both lateral margins may present nicks of varying depth, usually less than 2 cm. The same cervix inspected three months later, when involution is complete, has so completely reformed that the evidence of labor is limited to a change in the shape of the external os from a round dimple to an oval aperture, while on each side of this aperture there may be a shallow depression or nick.

The recommendation that the cervix be examined routinely in all deliveries in order that spontaneous injuries may be repaired at once offers nothing in reconstructive value to the cervix described above. Suture of these torn,

thin-walled lateral margins is usually a futile gesture and involution proceeds satisfactorily in spite of the interference. On the other hand, the routine exposure, manipulation and repair efforts in these instances very definitely increase the morbidity risk for the patient. Where major injuries are sustained following instrumental or manual interference or in the multipara who has violently driven her fetus through a partially dilated cervix or when searching for the source of hemorrhage, then indeed the cervix should be exposed. Repair of cervical injuries should be accomplished by interrupted catgut sutures placed 1 cm. apart, the first suture being placed above the angle of the tear as a hemostatic safeguard, and all sutures should be tied loosely for approximation only.

Postpartum inspection of the cervix will reveal those instances in which eversion has occurred and in which a cervical erosion is developing. Electrocauterization is an ideal remedy for this condition.

The significance of engagement of the presenting part is of major importance in the primipara when it occurs with lightening. The first obstacle of labor has been passed. It is recognized today that in the normal primipara engagement instead of occurring as it should in the last two weeks of pregnancy, may be delayed until the onset of labor. This occurs in 25 per cent of primiparae and does not indicate disproportion in such patients. In multiparae in whom engagement does not usually occur in advance of labor the matter of disproportion may be determined by direct measurement of the head against the inlet.

Engagement or non-engagement is usually easy to determine by abdominal examination with the hands placed in the fourth position of Leopold. If the head is engaged the hands will converge superiorly. If the head is not engaged the hands will diverge superiorly.

However, occasionally a patient will be found to be in active labor with the cervix dilated and the head still arrested at the inlet. Before proceeding to the cesarean section escape from this problem it is well to remember that the Walcher position of hyperextension of the thighs which enlarges the anteroposterior diameter of the inlet may permit the descent of the head. To obtain the full value of this device the membranes should be ruptured.

Analgesia and anesthesia have come into their own in obstetrics. On all sides pharmaceutical houses are recommending sedative products and reports have come from many clinics approving of these various drugs. The most popular are the barbituric acid derivatives. It must be emphasized that when they are used in small doses the patients are prone to become excitable and more or less uncontrollable. When they are used in maximal doses labor tends to be prolonged, usually requires operative termination and may require prolonged resuscitation of the fetus. The maternal reaction to these drugs is completely grateful, but the obstetrician who uses them must bear in mind the above mentioned disadvantages. Morphine in sufficient dosage remains the ideal anodye for the pain of the first stage of labor. The addition of scopolamin for its amnesic value is open to the same objections as those which apply to the barbiturates. Gaseous analgesia such as nitrous oxide oxygen or ethylene-oxygen is a first rate method for the control of the pains of the second stage of labor and may be deepened into anesthesia for the actual delivery. Prolonged inhalation of chloroform or ether, even in minimal quantities, cannot compete with either nitrous oxide or ethylene. Sedation and relief by rectal administration of either avertin or the Gwathmey ether-oil-quinine mixture is open to the same objections which apply to the other drugs of prolonged action.

Observation of the fetal heart tones throughout labor is a *sine qua non* of good obstetrics. As the contractions increase in frequency, severity and duration, surveillance over the welfare of the fetus must be increasingly alert until the fetal scalp appears in the vulva. The well-being of the fetus is best evidenced by observation of the heart tones. Once the scalp becomes visible the capillary pulse in the scalp is a very accurate measure of the condition of the fetal heart. Finger pressure produces a blanching which clears up more or less quickly, depending on the state of the circulation and to some degree on the extent of the edema in the caput succedaneum. The brisk or sluggish return of color is a most useful index. Failure to check the state of the fetus may result in the careful delivery of a dead baby.

Episiotomy has been recommended as a routine operative procedure in all primiparae and as a corollary in all multiparae in whom there has been a previous repair of the perineum. Certainly it is true that 50 per cent of all primiparae sustain some injury at the outlet. It is likewise true that occasionally with no appre-

ciable injury visible at the outlet there may be a partial separation of the fibers of the levators with resultant rectocele.

The appreciation of this problem should entail first: a knowledge of the location, breadth and depth of the intact levators; and second, an evaluation of the elasticity of the perineal body. The former can be studied on any woman by placing the finger, palm downward, against the posterior wall of the vagina and requesting her to pull in at the rectum or to squeeze the finger. The nullipara contracts the levator, which can then be felt as a solid sheet extending 6 to 8 cm. along the posterior wall of the vagina and reaching from one side of the pelvis to the other. The same test carried out on parous women will reveal the extent and nature of any previous damage sustained by the levators. As a rule, the defect is found in the anterior pillars, which in no way destroys the efficiency of the recto-vaginal septum, but results merely in normal gaping of the vulva of the parous woman.

The elasticity of the perineal body may be determined toward the end of labor by downward pressure with two fingers in the vagina. This will reveal the occasional presence of transverse fibrous bands which may be found at any level or a more widespread rigidity of the perineal body, either of which will justify episiotomy. In general, episiotomy should be done only after the perineal body has been distended by the advancing fetal head and impending tear is indicated by the transverse blanching or an extreme thinning out. Median episiotomy lends itself more readily to repair. Mediolateral episiotomy is indicated when the perineal body is short and the sphincter ani is jeopardized.

It is now clearly recognized that a knowledge of the outlet dimensions is important in the conduct of labor. The funnel pelvis with a narrow transverse diameter of the outlet, with a subpubic acute angle instead of a widespreading arch in which the head must emerge in the posterior segment of the outlet, demands a deep mediolateral episiotomy to insure the integrity of the anal sphincter.

Safe and intelligent conduct of the third stage of labor is primarily dependent on recognition of *separation of the placenta*. The evils of interference and haste in the delivery of the placenta have been dwelt on over and over again. Sufficient emphasis has not been laid on the distinction between simple expression of the placenta and the Crede method. Only 10 per cent of all women under the restraints of modern obstetrical technic deliver the placenta spontaneously. In these women the placenta has been separated, no longer lies in the corpus cavity at the placental site, but has descended into the lower uterine segment and upper vagina. A voluntary expulsive effort dislodges it from this level by the thrust of the contracted uterus above it and drives it through the vulvar outlet. In most women the placenta is separated within five minutes after the delivery of the fetus and has moved down to the level indicated above. Since many of these women are still partially anesthetized or cannot coordinate sufficiently to exert an expulsive force, "simple expression" is indicated. This consists in utilizing the uterus as a plunger to drive the placenta out. When the placenta is separated the fundus uteri is grasped through the abdominal wall and at the height of a stony hard contraction the corpus is pushed down against the loose-lying placenta.

In a minority of instances the placenta fails to separate. It may be adherent at the placental site or merely retained within the corpus cavity. In either case a thirty-minute wait is indicated, provided the patient is not hemorrhaging or is not in shock. After waiting the Crede method is employed. The uterus is grasped as above and at the height of a stony contraction its content is squeezed out without downward pressure on the uterus. Not until the placenta has been extruded from the corpus cavity is downward pressure indicated.

Obviously the time for aid in expelling the placenta and the method to be employed depends upon recognition of separation. Separation is recognized most readily by placing a marker of tape on the cord flush with the vulva, at the moment of delivery of the fetus, the slack having been withdrawn from the vagina. When this marker advances an average of 10 cm. the placenta may be considered to have separated. Another index is the characteristic change in the shape and level of the fundus which rises, becomes more pointed and flattens anteroposteriorly when the placenta leaves the corpus cavity. Further, upward pressure on the corpus does not affect the cord if the placenta has left the corpus cavity, but does pull the cord up into the vagina if the placenta is still retained. It is by a close observance of these evidences of sep-

aration that one may unhesitatingly attempt "simple expression" shortly after delivery or wait as long as two hours if separation has not occurred and cannot be achieved by the Crede technic. In most clinics manual removal is resorted to when separation has not occurred within two hours.

So-called "indirect expulsion" of the placenta is a method available when the placenta has separated and the patient is alert and cooperative. It obviates the necessity for any manipulation of the uterus. At the time of a stony hard contraction of the uterus the abdominal recti are grasped transversely at their outer borders above the umbilicus and pulled together. This temporarily reconstructs the abdominal wall and the patient is now told to bear down. This achieves expulsion of the placenta in 90 per cent of properly selected patients.

Resuscitation of the Fetus.—This not infrequently calls for skillful and prolonged attention. More brusque methods such as swinging, compression, hot and cold tubbing have been quite generally abandoned. The first essential is assurance that the air passages are clear. A simple pharyngeal aspirator may be used if, after a little observation, normal inspiration does not occur. Haste is ill advised, for so long as the fetal heart is beating, though slowly, resuscitation is almost always successful, provided the fetus has not sustained a major injury during its delivery. The head should lie in moderate extension, a rolled towel under the back of the neck serving this purpose. Body warmth should be maintained and very light skin friction, together with a snapping of the fingers against the soles of the feet. If the fetus does not respond rhythmical insufflation through a tracheal catheter is by far the most efficient, simplest and safest of devices. Little skill is required to learn to pass the tracheal catheter into the larynx. A No. 17 French with the opening at the end is satisfactory and can be employed in all except very premature infants. As much air as can be held in the slightly distended cheeks is puffed into the lungs 18 to 20 times a minute. This is sometimes successful, even after 30 to 45 minutes of primary respiratory failure. Mechanical respirators are useful, but first reliance should be placed on the tracheal catheter.

No single article can possibly include the many problems involved in the conduct of labor. Enough has been written to indicate that obstetrics is something more than midwifery. A sound approach to the consideration of the conduct of labor requires the acceptance of two statements of fact: (1) labor is the high point in a series of physiological processes; (2) every woman in labor is a potential emergency major surgical risk.

In the final analysis the outcome will depend on the judgment and the ability of the obstetrician.

THE INNERVATION OF MUSCLES OF THE ABDOMEN WITH REFERENCE TO SURGICAL INCISIONS*

By CHAS. S. WHITE, M.D., F.A.C.S.,
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One of the distressing complications or accidents of abdominal surgery is the occasional hernia at the site of the incision, or a general unilateral relaxation of the abdominal wall. It seems, in many instances, to defeat the very purpose of the operation, and thrust upon the patient a group of complaints that are unwelcome and painful.

Within the past year there appeared a symposium in a surgical publication, which dealt with the description of abdominal wounds. It was largely an analysis of cases in several New York hospitals, and probably representative of surgery in other American cities. The accident occurred, according to those contributors to the symposium, in approximately 1 per cent of the cases. Sokalov, a Russian investigator, after an exhaustive study of 726 cases, estimated that the accident occurred in 2 to 3 per cent of abdominal operations.

While this is not the specific subject of our paper, we believe that hernia or rupture of a wound cannot be considered in its entirety without reference to the innervation of the muscles involved.

In the symposium mentioned, and the discussion which followed, stress was placed upon the suture material, the method of closing the wound; reference was made to infection, the cachectic condition of the patient, the pulmonary complications and other indeterminate factors,

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*Read in Section on Surgery, Southern Medical Association, Twenty-Eighth Annual Meeting. San Antonio, Texas, November 13-16, 1934.

*From the Department of Surgery, The George Washington University School of Medicine.

but very little was said of the type of the incision and the disturbance of the innervation of the muscles involved in the hernia. We are not prepared to state that the injury to the nerves is the most important single element in the cause of postoperative hernia, but we are firmly convinced that an indifference to the nerve distribution of the abdominal muscles should share part of the responsibility.

It is not an unusual experience, at least it has been our own, in the re-examination of patients several months, or even years, after an abdominal operation, to find that a hernia had made its appearance, although the wound had healed *per primum* and the patient had left the hospital with what was considered a satisfactory wound.

Something has happened to the wound in the interval between the discharge from the hospital and re-examination in the office. The history indicates that no infection was present, yet there has been a gradual separation of the muscles, and possibly the fascia. The patient is asked to cough and there is a definite bulging under the skin. In all probability the patient is cognizant of a weakness and visible swelling in this region. One cannot explain these cases on the grounds of infection alone. We feel that muscular weakness, which means nerve injury, is to be charged with the accident. It is not a simple matter to place the responsibility where it belongs.

One has to visit but a few operative clinics to find that most incisions are made primarily to expose the pathologic condition within the abdomen, and little consideration is given to the method by which the operator gets in, and less thought as to how he gets out. The closure of the wound is relegated to a subordinate on the operating staff, and while the wound is often well closed, just as often it is hurriedly and poorly done. The abdominal wall is sacrificed for accessibility, particularly by the unskillful surgeon, and occasionally by the more experienced. It is rather the exception than the rule to witness a painstaking protection of muscles and nerves. Certain incisions, such as those of Kammerer and McBurney, are based largely on the sound principle that minimum trauma insures better wounds.

Some experimental evidence has been submitted to show the effect of nerve section on the muscle innervated, but the sum total of the research has been contradictory. The muscles of the abdomen have rather a constant nerve supply, the chief variation being in the relations and anastomoses of the iliohypogastric and ilioinguinal. Nerves can be injured by a drainage tube, by destructive infection, tension, and pressure of a retractor, by the bite of a forceps, and by inclusion within a suture. Even the very excellent McBurney incision is abused in efforts to bring a shy appendix into public view and the suturing of this same wound undoubtedly, if crudely or carelessly done, can involve and seriously impair the function of the nerves in this region, namely, the iliohypogastric and ilioinguinal.

Last year we assigned a group of junior students to a careful dissection of the abdominal wall, stressing especially the muscles and their innervation, working each major nerve out to its ultimate macroscopical divisions. We supplemented this work with some dissections of our own. From an anatomical standpoint, we did not develop any new facts or have reason to disagree with standard textbooks on the subject. What we saw was common knowledge to most anatomists, but from a surgical angle it exposed a rather deficient working knowledge of the innervation of the abdominal muscles. All the major muscles of the abdomen receive their nerve supply from the four lower intercostals and the first lumbar, and they run diagonally downward from their origin to their final distribution, passing in the substance of the muscles. The rectus muscle receives its nerves, four or five in number, on the posterior sheath, and these enter the muscle in its posterior aspect. It was quite apparent that any long vertical incision lateral to the rectus muscle would divide one or more nerves, and splitting of the rectus would divide the nerve fibers which supply the medial part of the split muscle. By laying a pattern of some of the common abdominal operations over drawings of the dissections, it became evident that nerve injury must be unavoidable in entering the abdomen in many instances.

One may ask if such nerve injury is followed by hernia or weakness of the abdominal muscles. To follow up accurately a large group of such cases is no small task, and we have not attempted to do so. We merely wish to indicate that such a line of endeavor seems worth while. We have been impressed with the number of cases of right inguinal hernia that have followed appendectomies with drainage, and attach some importance to it, rather than dismissing it as a mere coincidence. Southham, an English sur-

geon, has called attention to it in a rather convincing article.

Whether many nerves that have been surgically divided by the nature of the incision regenerate and restore the activity of the impaired muscle or whether the distal portion of the nerve remains degenerated, is a problem that needs illumination.

It is our opinion that the subject is worth mature consideration, and that anatomical relations of the abdominal wall deserve more attention at the hands of the surgeon.

We are reminded, in this connection, of a sign we have frequently seen on newly made lawns, "Please give the grass a chance." This could well be paraphrased and stated thus: "Please give the nerves a chance."

RECONSTRUCTIVE SURGERY OF THE COMMON BILE DUCT*

By GILES COORS, M.D.,
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Since the surgery of the biliary system dates from recent time, it is surprising to find the voluminous amount of work done in this field and the ingenious and varied surgical methods that have been employed to relieve damage to the biliary tree.

There is no doubt in my mind that there is no best method to remove a gallbladder. At times it is better to remove from the cystic duct toward the fundus which, in most instances, is ideal unless the gallbladder is too friable to justify the necessary angulation; at other times it is better to remove the gallbladder from the fundus toward the cystic duct, which at times is necessary in the large, thick-walled, friable gallbladder. Because of the wide variation of the arrangement of the ducts and vessels in the free edge of the gastrohepatic omentum, it is hard to say just what is normal and what is an anomaly. However, by conservative estimate, deviation from the usual relations of these structures occurs in about 25 per cent of cases.

All good surgeons urge that all the structures be identified before the application of clamps and ligatures in this area. Notwithstanding all the care each of us tries to exercise, there are numberless cases reported of injuries to the hepatic and common ducts, and also the hepatic artery by capable, honest surgeons.

We are all aware of the dire consequences, both clinically and in experimental animals, that follow the ligation of a solitary hepatic artery, which produces symptoms similar to those of an acute yellow atrophy of the liver, and is followed by death.

The ligation of the common or hepatic ducts results in an immediate cholemia, jaundice, rapidly increasing icterus index, and a direct immediate positive van den Bergh. Damage to these ducts without ligation results in an external biliary fistula with acholic stools.

A great many measures are helpful in determining the exact anatomy. Among those are, first, the opening of the edge of the gastric hepatic omentum, careful dissection into discreet entities, and examination of the anatomical structures involved in the operation. One should always keep in mind the large percentage of anomalies present in this area. A curved surgical transilluminating light will aid materially in this area. Look carefully in the stump of tissue included in the clamp intended to embrace only the cystic duct to see whether there are two stomas instead of one. The aspirating needle, as advocated by Dr. Deaver, is used to ascertain the character of the fluid in the suspected structure, bearing in mind the plexus of veins overlying the common duct, which may confuse one and lead him to believe that he has entered the portal vein. The needling of a suspected mass in the area of the common duct will by its physical characteristics differentiate a stone from an enlarged gland.

Lillienthal has brought to our attention the danger of too much traction on the cystic duct producing a "Y" angulation with the common and hepatic ducts, making it a very easy matter to include both the common and hepatic duct in a clamp. A great many injuries occur during the injudicious use of a heavy, crushing clamp in a blood-filled field following the occasional accidental release of a cystic artery. If a finger is passed into the foramen of Winslow underneath the gastrohepatic omentum and the thumb is applied on the anterior surface of this omentum pressure can be made on the hepatic artery, producing a dry operative field, and by temporarily releasing this pressure accurate securing

*Read by title in Clinical Session, Surgery, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

and ligation of the cystic artery can be accomplished.

In performing operations to relieve the damages to these ducts or any obstructing neoplasm, there are a few cardinal aids in identifying the structures to be utilized in the repair. If an external fistula exists, dissection of this to its origin will localize the upper end of the patulous duct. If no external fistula exists there will be found a greatly dilated remnant of the duct leading from the liver. This duct at times may be so dilated and engorged that it may resemble the portal vein. The aspiration of its contents will give valuable aid in the definite identification of this structure.

Almost every conceivable type of short circuit of the biliary stream has been resorted to. The gallbladder has been anastomosed successfully to the stomach, the duodenum, the jejunum, common duct and the colon. The cystic duct has been anastomosed to the stomach, duodenum, jejunum and colon. The common duct has been successfully anastomosed to the stomach, duodenum and jejunum. The hepatic duct has been anastomosed successfully also to the stomach, duodenum and jejunum. Even denuded liver substance has been anastomosed to the duodenum and jejunum. End-to-end anastomosis of damaged ducts either with or without the use of the splinting aid of rubber tubing, "T" tubes and "L" tubes. Implantation of external biliary fistulae have been successfully made into the stomach, duodenum, bile duct and jejunum.

Plastic reconstruction of portions of the bile tract has been accomplished both by pedicle flaps from the stomach and longitudinal incisions sutured transversely. Strictures in the ducts have been successfully dilated by means of forceps and bougies. The above mentioned anastomoses have been accomplished both by direct coaptation and also by the utilization of many ingenious intervening foreign materials such as Murphy buttons, decalcified bone plates, decalcified bone bobbins and rubber tubing with clever cuffs, with superimposed rubber rings upon them to aid in their retention in the ducts for sufficient time to allow complete epithelialization of the newly formed canal.

In creating a new stoma in the alimentary tract it is always wise to accomplish some formation of a valve such as is formed in the Witzel type of enterostomy. This in a measure prevents regurgitation into the biliary tract of infectious alimentary contents which would produce rigors, fever and intermittent jaundice.

Of the many methods of repair at our disposal, anastomoses of the gallbladder to the stomach, preferable, or to the duodenum, usually function well. A direct anastomosis of the ducts, for example, over a "T" tube, performed soon after the injury, usually gives the most lasting satisfaction. The indirect method, that is, the waiting for formation of a new segment of the biliary tract over a tube, usually gives satisfactory immediate results with a great danger of secondary contraction and unreliable end-results. The transplantation of liver parenchyma to the alimentary tract is attended with extremely small hope of success. Plastic operations on the biliary tree give faint hope of good results. The implantation of the hepatic or common ducts into the duodenum have given excellent results. The implantation of biliary fistulas into the alimentary tract has been too recently a fad to permit correct evaluation of its utility. However, as the very well recognized persistence of the external biliary fistula has been observed by all of us, it gives promise of continuing to flow into the alimentary tract.

CASE REPORT

The case which I have to report to you is that of a man upon whom a cholecystectomy was performed on May 8, 1933, following which there developed an almost immediate and intense jaundice. When the abdomen was reopened, the dilated stump of the hepatic duct was found to be ligated, greatly distended and dilated. It was impossible for me to find the lower end of the common duct. A rubber tube was inserted well up into the hepatic stump and it projected into the duodenum through a Witzel type of enterostomy. The falciforme ligament, parts of the gastrohepatic omentum and the greater omentum were utilized in bringing the gap between the hepatic stump and duodenum, which was about 4 cm.

The patient's jaundice immediately cleared up and he had practically no external biliary drainage. Contrary to what is the custom, the duodenal peristalsis did not remove the tube and it remained in its position unchanged, as verified by numerous x-ray plates, for a period of many months. Each succeeding x-ray plate showed an increasing amount of biliary concretion encrusted upon the intra-ductal portion of the tube. As the intra-ductal portion continued to grow in diameter and the patient exhibited recurrent attacks of cholangeitis, I concluded that it was wiser to remove this tube surgically, which was done through a stab wound in the jejunum on May 18, 1933. It has been eight months since the removal of this tube and since that time he has shown no cholangeitis, jaundice, or any evidence of biliary dysfunction.

THE VALUE OF PRESACRAL SYMPATHECTOMY IN GYNECOLOGY*

By PETER GRAFFAGNINO, M.D.,
New Orleans, Louisiana

The idea of relieving pelvic pain by abolishing the function of certain nerves is not a new one. As far back as 1898, Jaboulay suggested paralyzing the sacral sympathetic nerves in cases of intractable pelvic neuralgia. Ruggi, during the next year, advised resection of the utero-ovarian plexus. The results of these operations were not entirely successful: some patients were relieved, some were partially relieved, and others had recurrence of pain. Besides, these procedures were looked upon with disfavor by the contemporaries of Jaboulay and Ruggi and were finally abandoned. Leriche introduced periarterial sympathectomy of the internal iliac artery as a means of relieving pain in cases of functional dysmenorrhea, performing the first periarterial sympathectomy in 1913. His report in 1921 aroused new interest in this field of surgery. Because Leriche's operation was somewhat difficult to perform, Cotte, in 1925, recommended resection of the superior hypogastric plexus, which yielded the same excellent results. This procedure was employed in functional dysmenorrhea, inoperable carcinoma of the uterus, dyspareunia, vaginismus, painful cystitis, functional disturbances of the bladder, persistent leukorrhea, nymphomania, frigidity, pruritus vulvae, amenorrhea, and trophic disturbances of the ovary. The same surgical procedure of resection of the superior hypogastric plexus has been employed by Learmonth and others in the treatment of cord bladder and painful bladder, and in Hirschsprung's disease, since the superior hypogastric plexus (the presacral nerve of Latarjet) contains nerve fibers conducting vasomotor responses to the vessels of the bladder, sigmoid and rectum, contracting impulses to the internal sphincter of the bladder and rectum, inhibiting impulses to musculature of the bladder and rectum, and contracting impulses to the urogenital trigon and afferent pain fibers.

PHYSIOLOGY AND ANATOMY

A question may be raised concerning the possible harm done by removing a portion of the sympathetic nervous system. Ranson states that Cannon and his students completely removed the "sympathetic chain on both sides, from the highest cervical to the lowest sacral ganglion. Such completely sympathectomized cats have lived under laboratory conditions for many months. Everything indicates that almost any part of the sympathetic system can be removed without seriously endangering life." Section of the superior hypogastric plexus does not alter the normal menstrual cycle nor does it interfere with uterine contractions during labor. Likewise, section does not produce glandular atrophy or any disturbances in the motor function of the bladder or rectum.

Fontaine and Herrmann stated that the hypogastric plexus exerts a vasoconstrictor action on the vessels of the internal genital organs, whereas the parasympathetic nerves exert a vasodilatory effect. The sympathetic nerves inhibit the secretion of the genital glands and the parasympathetic nerves stimulate the glands of secretion. The exact control of the motility of the uterus is still unknown. Langley and Anderson demonstrated that the center of the rabbit's uterine contractions is situated between the tenth dorsal and the second lumbar segment of the spinal cord. Dahl considers the sympathetic fibers as the excitors, and the parasympathetic fibers the inhibitors of uterine contractions.

As has been said, resection of the superior hypogastric plexus does not alter the normal menstrual cycle. Fontaine and Herrmann noted that an atypical or supplementary menstrual period will occur on about the second postoperative day if the last regular menstrual period ended four or five days prior to the resection of the superior hypogastric plexus. They said:

> "We are inclined to believe that this is the result of an intense uterine congestion which follows the pelvic sympathectomy, and so it should not be considered as a true menstrual period. The subsequent menstrual period appears about twenty-eight days after the preoperative period and not in relation to the supplementary postoperative hemorrhagic discharge from the uterus."

They further stated that there are many cases on record in which normal parturition took place when patients had previously been subjected to resection of the superior hypogastric plexus for the relief of some painful condition in the pelvis.

Fontaine, Herrmann and Leriche stated their belief that the hypogastric plexuses carry the important pathways of sensation from the internal genital organs to the medullary center, and that resection of the superior hypogastric plexus above the hypogastric ganglion is a safe, simple and effective way of interrupting these

*Read in Clinical Session, Obstetrics and Gynecology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

pathways in the treatment of functional dysmenorrhea and inoperable carcinoma, as well as a method of treating other forms of severe pelvic pain. It is possible that presacral fibers carry afferent sensations of pain, but it appears that the relief of pain in functional dysmenorrhea and inoperable carcinoma is obtained not only by cutting the pain fibers, but from interruption of efferent fibers in the presacral group, which supply the blood vessels in the genitalia and the musculature of the uterus.

The presacral nerve can readily be found if one looks for a triangle the base of which corresponds to a line uniting the two common iliac arteries at the level of the sacral promontory, the sides being these arteries and the apex of the triangle being the point of bifurcation of the aorta. This triangle occupies the lower third of the fourth lumbar vertebra. The triangle is divided vertically into two equal halves by the middle sacral artery, which arises from the back part of the aorta just at its bifurcation and courses straight down to the upper part of the coccyx. Since this vessel is easily felt through the peritoneum, it is often mistaken for the presacral nerve, which runs parallel to it. From the origin of the inferior mesenteric artery down to the bifurcation of the aorta, the nerve fibers lie on the aorta, separated from it only by a layer of thin connective tissue. The branches of the plexus which accompany the left common iliac vein are separated from this vessel by areolar tissue, making elevation of the nerve easy. However, as the nerve fibers go still farther down, they lie on the peritoneum and perichondrium of the last lumbar vertebra and the cartilaginous disc between this vertebra and the sacrum. At this point the plexus lies above the middle sacral artery and vein.

The entire triangle is covered with peritoneum; hence the nerve plexus lies between the peritoneum and the underlying bones. The fibers are not adherent to the peritoneum, but are separated from it by more or less fatty tissue, depending on the obesity of the patient.

Usually the inferior mesenteric vessels may be seen to the left of the midline, but sometimes these vessels are in intimate contact with the presacral nerve. This is due to an abnormal anatomic position and undue length of the pelvic mesocolon, whereby the right root of it is inserted in the midline or still farther to the right.

In Elaut's fifty dissections he never found the presacral nerve in front of the sacrum. It was always above the promontory in front of the body of the fifth lumbar vertebra and the intervertebral cartilaginous discs below and above this vertebra. Hence the nerve was always prelumbar. Elaut found that the bifurcation of the nerve varies considerably. Usually it is at a point below the bifurcation of the aorta; occasionally it is at the same level as the division of the aorta, but rarely it is at the base of the triangle.

There is seldom any need to worry about the ureters except in the cases in which the pelvic mesocolon must be pulled to the left to permit exposure of the triangle.

DYSMENORRHEA

Dysmenorrhea is divided into two types: the first is designated as essential or primary dysmenorrhea, and the second as secondary dysmenorrhea, since it is associated with other demonstrable pelvic pathologic changes, such as uterine myoma, endometriosis, or salpingitis, with which we are not concerned.

Primary dysmenorrhea, on the other hand, is not dependent on pelvic pathologic change, but may be associated with it. Its treatment by interrupting the sympathetic innervation of the generative organs surgically has already been mentioned, as has also the operation of choice: resection of the superior hypogastric plexus (presacral nerve) as advanced by Cotte.

In this condition, the pelvic organs usually appear normal, and for this reason it is essential to analyze each patient carefully in order to apply the correct surgical treatment.

Many theories have been propounded to explain the causation of primary dysmenorrhea. One of the oldest, which is still quite widely held, is that the pain is due to obstruction to the exit of the menstrual blood from the uterine canal, most often because of anteflexion of the uterus. With the passage of years, however, this theory has been abandoned as explaining more than perhaps a small minority of cases.

That hypoplasia of the pelvic organs is a cause, is a view that has gradually taken root, and some have linked the two factors of obstruction and hypoplasia together, asserting that anteflexion is in itself an evidence of hypoplasia, and that it in turn gives rise to obstructive dysmenorrhea. However, no satisfactory explanation of the mechanism of the pain is available, in spite of the fact that a number have been suggested.

Nothing is more certain than that the psyche frequently plays an important, perhaps essen-

tial, role in the production and perpetuation of menstrual pain. There are some gynecologists, notably J. Novak and M. Harnik, who believe that all cases of primary dysmenorrhea are explainable on this basis. These authors assert that careful investigation will practically always reveal that a psychic trauma of one sort or another lies at the bottom of the first attack of dysmenorrhea, and that the recurrence of monthly attacks is the result of the anxiety or fear thus subconsciously associated with the function.

The relationship of endocrine dysfunction to dysmenorrhea has received much attention recently. That such dysfunction does exert definite influence cannot be denied.

Other investigators have considered the severe uterine contractions in dysmenorrhea to be the result of a disturbance or imbalance in the pelvic sympathetic nerve plexus, resulting not only in dysfunction of the uterus, but of the ovary as well.

Whatever the cause, the following results were obtained by a combination of presacral and periarterial sympathectomy:

Michon reported complete relief of all subjective symptoms in 22 cases. Cueille, in 1929, also reported that complete relief of the pelvic pain had resulted from resection of the presacral nerve in 12 cases. Fontaine and Herrmann obtained excellent results with 13 of 15 patients whom they were able to follow by questionnaires. Other foreign surgeons have confirmed these results, while Adson and Masson in this country likewise obtained nearly complete relief in their 6 cases. Counsellor and Craig, of the Mayo Clinic, added 8 cases to those of Adson and Masson from the same clinic. Results obtained in the 14 cases are as follows: 9 patients obtained 100 per cent relief; 2, 95 per cent relief, and 3, 73 per cent relief.

SURGICAL TECHNIC FOR RESECTION OF THE SUPERIOR HYPOGASTRIC PLEXUS

The abdomen may be opened by a median subumbilical incision. Before the peritoneum is opened the patient is lowered from the horizontal position to the Trendelenburg position. The small intestines and colon are packed upward toward the diaphragm. The rectosigmoid colon is then retracted laterally to the left. The uterus and adnexa should be examined to verify the diagnosis. The promontory of the sacrum and the two common iliac arteries are then located. The posterior parietal peritoneum is then incised at a point just above the promontory of the sacrum and directly in the midline. Immediately beneath the peritoneum and anterior to the midsacral artery will be found the nervous filaments which constitute the superior hyogastric plexus. In very thin women these fibers can be seen through the peritoneum, while in obese women the plexus is usually embedded in much adipose tissue. If the mesosigmoid is short, care must be taken not to injure the inferior mesenteric vessels. After all the filaments have been isolated a segment, at least 1 inch long, should be resected from each main nerve fiber in order to prevent any possible regeneration. The posterior peritoneum is then closed by a continuous suture of fine, plain catgut. Any supplementary operation that is indicated should be done at this stage of the operation. The abdominal wall should be closed in layers.

INOPERABLE CARCINOMA

The severe pain associated with inoperable neoplasms in the pelvis, or more rarely, due to the sclerosis in the pelvis following intensive radiation by radium or deep x-ray therapy, should be treated surgically in spite of the fact that there is no hope for an operative cure of the neoplasm. Numerous procedures have been proposed for the relief of pain under such circumstances, but most of them have failed to give uniformly satisfactory results; however, if the surgeon performs an extensive sympathectomy within the abdominal cavity he has an opportunity of verifying the pathological lesion, determining its extent and occasionally finding the cause for the extreme pain. Professor Leriche was the first to show that the mechanism of the production of pain was not the same in all cases. In one case he simply removed a pyosalpinx which had developed as a result of intensive deep x-ray therapy and which had become adherent to the common iliac artery. The pain disappeared completely after the removal of this inflammatory mass from the artery. Another patient showed typical root radiation of the pain, consequently she was completely relieved of the pain after section of the corresponding posterior root. In all cases in which there is no metastasis to the vertebra and no typical root radiation of the pain, we believe that it is advisable to verify the extent of the neoplasm and, if possible, determine the cause for the severe pain, and then perform the complete sympathectomy. Ferey (1927) has suggested the removal of the superior hypogastric plexus in every case in which a hysterectomy is performed

for carcinoma of the uterus as a prophylaxis against the pain in case there is a recurrence of the carcinoma. At present it is difficult to judge the real therapeutic value of such a suggestion. In 1925, Professor Leriche suggested the resection of the presacral nerve from its origin at the inter-mesenteric plexus to the lower part of the aortic bifurcation, together with the resection of both lumbar sympathetic chains for the complete relief of the severe pain due to inoperable neoplasms in the pelvis. Tisserand applied this procedure some time later, and he also obtained excellent results. Because the results published by Ferey (1929) show that only partial relief of the pelvic pain is obtained by simple section of the superior hypogastric plexus, we have been advocating the more complete removal of the pelvic sympathetic nerves. There is no great added risk in performing the complete pelvic sympathectomy and one can be quite certain of complete relief from the most intolerable pelvic pains.

OPERATIVE TECHNIC

The abdominal wall should be opened by an incision in the midline, extending from just above the symphysis pubis to a point about 1 inch above the umbilicus. Before the peritoneum is opened the patient should be placed in the Trendelenburg position.

(1) Incise the posterior parietal peritoneum just over the lower portion of the abdominal aorta and remove all of the sympathetic nerves of the pre-aortic plexus from the origin of the inferior mesenteric artery to the promontory of the sacrum.

(2) Isolate the superior hypogastric plexus and resect as much of it as possible.

(3) Isolate the right lumbar sympathetic chain which is usually situated just at the lateral border of the inferior vena cava and resect at least two (usually third and fourth) of the lumbar sympathetic ganglia.

(4) Isolate the left lumbar sympathetic chain which usually can be found just beneath the left border of the abdominal aorta and resect at least two of the lower lumbar sympathetic ganglia.

RESULTS AND CONCLUSIONS

We have thus far performed sympathectomy of the superior hypogastric plexus on 6 patients who had inoperable carcinoma of the cervix, and were satisfied with the results obtained, because most of the patients experienced instant relief following the operation.

We have also performed resection of the presacral nerve in 6 cases of primary dysmenorrhea and in all of these cases our results have been more than satisfactory. We have been able to follow some of these cases for periods of three months and all have menstruated without discomfort.

This series of cases is entirely too small to draw any definite conclusions, but, taken together with the experiences of other operators, we feel that we are justified in saying this operation has a definite indication in selected cases of primary dysmenorrhea and inoperable carcinoma of the pelvis for the relief of pain.

SOME CLINICAL EXAMPLES OF INDIRECT SUICIDE*

By KARL A. MENNINGER, M.D.,
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In all of us, as has been pointed out by Freud, there are two dominant tendencies: one to live and one to die, or, as they are often described, the instinct of self-preservation and the instinct of self-destruction. These two are constantly in conflict within us, tearing down and building up, preserving and destroying. At the moment we begin to live we begin also to die. As time goes on we gradually sacrifice our hair, our teeth, our muscle elasticity, and when these can no longer be renewed we die.

The act of suicide is a dramatic representation of the instinct of self-destruction. It is as if the person must take the inevitable act of death into his own hands and in this direct way put an end to living. This sudden dramatic triumph of the destructive instinct over the life instinct has been observed by psychiatrists for a long time.

But what I wish to speak of is not the immediate operations of the death instinct so plainly exemplified in suicide, but rather the various indirect operations of the tendency toward self-destruction. We know that even suicide can be accomplished indirectly, that is, without the active, conscious participation of the individual. We know of people who seem to have accidental deaths which, we are convinced from our knowledge of the case, are unconsciously determined. I do not refer to actual suicides which the per-

*Read in Section on Neurology and Psychiatry, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

sons out of pride, consideration for family, or greed, try to make look accidental, but to those cases in which the person would not purposely and consciously bring about his death, and yet gives considerable evidence that he had unconsciously wished for it. I know of a man who had had many disappointments and was quite depressed and in fact had tried several times to commit suicide, but was unsuccessful. A little later, however, he accidentally stepped in front of an automobile and was killed. There is no proof that this accident was unconsciously self-determined, but it is plain that the man's own carelessness brought about the accident and to that extent he brought about his own death.

Another illustration, even more dramatic, recently came to my attention. I read in a newspaper of a man who had arranged a burglar trap in such a way that a gun would shoot anyone who tried to steal his chickens. He forgot that he had done so, however, and entered the chicken house himself first and was killed by his own gun. I thought this was a neat illustration of a death sentence, self-inflicted, and I cut it out, thinking it was most unusual. In two months I found another illustration of a man who had put a trap in his garage to protect his automobile. He went away on a trip for a month and upon his return was killed by his own thief trap. I saved this clipping, too, and began to look for more. In a year I got five examples of men who were caught in their own traps, set to kill another man. I do not believe these accidents can be explained as mere coincidence. For a man to be caught in his own death trap it seems there must be an element of (unconscious) guilt, perhaps arising in part out of his desire to kill another man (the thief).

But these illustrations are not very convincing to some because, of course, we cannot obtain clinical proof after the individual is dead. I want, therefore, to leave this somewhat tenuous type of illustration for material which demonstrates indirect self-destruction in forms that are slower and less dramatic, but just as sure.

One of these forms of chronic self-destruction is alcoholism. Even the layman knows that people drink themselves to death. What he does not know is that the original difficulty in such cases is not the alcoholism, but the underlying personality defect which creates great inner tension and leads the individual to seek relief. Alcohol, as a means of escape from inner tension, is more socially acceptable than morphine and other drugs, and hence more popular. Thus, at first, the alcohol is taken as an attempted cure for a psychological illness. Physicians are familiar with patients who use a relief-giving drug, such as barbital, as a means of suicide; so it is with the person who finds temporary relief in alcohol, but eventually destroys himself by its excessive use.

I can illustrate this with the case of a man in whom I was able to study some of the psychological factors which led to his drinking. His father was a celebrated lawyer, a brilliant but domineering man who was determined that his son should follow in his footsteps. The boy was very promising and his father was proud of him, although he treated him with great severity. The boy grew up with a great hatred for his father which he did not dare express. When his father insisted on his going away to the university to study law, the boy, now a young man, did attempt to rebel, but the habit of years was too strong and he again fell under his father's will. His rebellion and his strong hostilities became evident in indirect ways, however, for in the law school he began to drink heavily until finally it was necessary for him to quit school and give up the attempt to become a lawyer. He had thwarted his father's dearest hopes, but at the same time he defeated himself and in the years that followed he continued this course of self-defeat. He went into a number of businesses, each one of which proved a failure. His marriage was a complete failure and he is now separated from his family. The alcoholism, instead of being the cause of all his troubles, was only one of many ways in which he ruined his own career to spite his father and relieve his sense of guilt and inferiority. In every way his life has been a failure, a long-continued rebellion against his father and punishment for that rebellion.

There are other ways in which individuals condemn themselves to a living death. Asceticism, for example, which was so familiar in the early days of the church, is still in existence. I do not mean in religion only, but in everyday life. The Europeans say Americans do not enjoy life, that they are not loving to their women, they are not interested in their children, that they live only to work, eat and sleep, they cannot allow themselves pleasure. I do not wish to discuss American asceticism, however, except in the form of clinical examples that come to the attention of psychiatrists.

A conspicuous example of this ascetic attitude toward life was furnished me by a patient who, although well-to-do, lived in a mean room furnished meagerly with a bed, a table and one chair. He did not permit himself the indulgence of going to a good restaurant, although he liked food very much. Instead, he cooked most of his meals in his room surreptitiously. He had scarcely any utensils and his cooking was a dismal failure. When he went out he made a peculiar appearance, for his clothes were of poor quality and usually unpressed. He did not allow himself the luxury of going to a barber, but cut his own hair. Although he was a talented musician, he would not spend money for a ticket to a symphony orchestra. Yet he was not a true miser, for he would spend money freely on things that gave him

no pleasure. His conscience demanded that he deny himself all comfort and enjoyment in life.

I have called this self-destruction, for surely such a self-imposed sentence of deprivation is a kind of slow suicide. Furthermore, this ascetic mode of life did almost destroy this man's life, for it denied him all friendships and social contacts; it finally led to his giving up his music, and it impaired his health.

This was even more evident in another patient, a woman who married a man whom she considered an irresponsible ne'er-do-well. Although this girl had been given every advantage in her home, she suffered from a sense of guilt that would not allow her to make a success of anything she undertook. She entered college, but failed in her school work. She went to work, but became slightly ill and immediately gave up her position and became a semi-invalid. She then met the man she married and during the early years of her married life denied herself many pleasures to help him pay off his debts and make a start in business. Eventually he became very successful and distinguished and was able to lavish money upon his wife. They traveled and met interesting and prominent persons and went out in society. But with this unusual measure of success, the wife became increasingly unhappy. She antagonized her friends and her husband, ceased to take an interest in her appearance, and finally withdrew from everything that gave her pleasure and lived a dull and lonely life in a little village.

The psychological factors in this case were interesting. This woman, as a child, had been the favored daughter. Although she had two sisters, she was considered the beauty and the most promising child. Her parents and her sisters sacrificed necessities to give her beautiful clothes, leisure, dainty food and opportunities for travel and education. She took all this, apparently, as if it were her due, but analysis showed that she really had strong unconscious guilt feelings which prevented her from enjoying these advantages fully or using them profitably. She felt she must pay for her extraordinary privileges by great suffering. Before she discovered this strong self-destructive trend in herself through analysis, she had managed to lose her home, her friends, her husband and her career.

There are other forms of indirect self-destruction in which the individual destroys a part of himself rather than the whole. We see many cases of patients who cut off parts of the body. I have collected many examples of striking self-mutilation. One of these was a woman who was under treatment in a sanitarium. She was taken out by her mother, against advice. Soon after she killed her own baby. She became very agitated after this and one day slipped away from her home and ran to the railroad track, where she placed her right arm (the arm that had killed her child) on the track and allowed the train to cut it off. After this she recovered rapidly and has remained well ever since. It has been said that suicide is often the death sentence self-inflicted. This woman's act represented a symbolic suicide, in that she recognized her own guilt for the murder and killed the part of herself that she considered guilty, namely, her right arm.

This same motive has been shown to exist in many patients who mutilate themselves in a lesser degree, as by skin digging, biting off nails, compulsive scratching, and so on. Such neurotic mutilations are often equivalents for masturbation, it is true, but at the same time they are self-punitive and self-destructive.

No less self-destructive, although more difficult to demonstrate as such, is malingering. I refer to that type of malingering in which the individual actually injures himself in order to secure attention, pity or money. I do not believe that the underlying motive of malingering is to gain money (or attention). I contend, rather, that the malingerer who mutilates himself does so for the same reasons that prompt any neurotic mutilation, and that then his strong aggressions against people lead him to capitalize the injury in a way that is particularly disagreeable and mortifying to the persons who wish to help him, namely, by fooling them. This aspect of the matter blinds us to the fact that the malingerer has actually destroyed a part of himself, and that in addition to this act of physical self-destruction, he has also destroyed (if he is found out, as he usually is) his own prestige and the confidence and respect his friends hold for him.

There is still another form of partial self-destruction in which individuals by one means or another make someone else responsible for their self-punitive attacks. For example, these patients can make the surgeon feel that an operation is necessary or at least that there is sufficient indication for the operation to cause him to give the patient the benefit of the doubt. We know that the neurotic patient can simulate disease unconsciously and we know also that patients are sometimes successful in inducing surgeons to mutilate them unnecessarily. Indeed, it is not uncommon for a neurotic individual to try to avoid a difficult situation such as the necessity for psychological treatment, or impending marriage by seeking a surgical operation.

The foregoing examples of self-destruction have to do with the striated musculature and the voluntary nervous system. I believe that the autonomic nervous system and the smooth muscles carry out the unconscious wishes of the individual also, in two ways: first, in conversion hysteria, for example in aphonias and anorexia; second, by structuralization of these hysterical

manifestations. I think we all recognize intuitively that self-destructive impulses may be carried out through the autonomic nervous system, as, for example, in the gastro-intestinal processes where excessive emotional stimulation of the stomach leads to gastric ulcer. We say such conditions are caused by the emotional state, and that the emotion is relieved by the flowing of hydrochloric acid. But this does not explain why the process goes on to produce organic self-destruction. I think it is because there is working throughout the entire personality a destructive instinct which may be carried out in its entirety in the form of direct suicide, or may be limited to partial or focal forms of self-destruction, in which case it may be carried out by the voluntary nervous system or by the autonomic nervous system.

This is merely an outline of a thesis which I have been investigating for a number of years. I could present a great deal of clinical data which we have amassed, were there time. From the study of many cases we have drawn some conclusions about the destructive impulse and why it is turned inward against the self in some people instead of outward upon the environment as in normal people. We have also determined what causes a certain individual to choose a particular form of self-destruction in some of these cases. These conclusions we have been able to utilize in therapy, but that is a subject for another paper. For the present I have merely tried to suggest a method of approach to further research.

DISCUSSION (*Abstract*)

Dr. A. L. Skoog, Kansas City, Mo.—Dr. Menninger mentioned alcoholism as an illustration of indirect suicide. Possibly quite a few individuals using alcoholic drinks to excess would come under this classification, but I believe that a great many persons indulge moderately or even excessively in such beverages without any suicidal intentions, either consciously or unconsciously. I should like to call the essayist's attention to one individual, a Mr. D., about whom he was consulted at one time, some years past. This individual literally destroyed himself by alcoholic indulgences. He was under my care many times and on a number of occasions expressed himself as not being interested in life any longer and said that he might as well kill himself by drinking. His exitus happened this year and may be ascribed to alcoholism. He could not meet the problems of life as a normal individual should and would have done. Perhaps his was a cyclothymic psychosis.

Dr. W. R. Houston, Augusta, Ga.—The topic that Dr. Menninger has developed is one of intense interest and wide scope. I sympathize heartily in his conception that some impulse to self-injury is a plausible and sufficing explanation of many phenomena that we meet with in practice, not merely overt self-mutilation and suicide, but the more numerous and important damages people covertly inflict upon themselves both consciously and unconsciously. This is a conception that explains many obscure behavior patterns, many organ neuroses that would otherwise be inexplicable.

I regret to say, however, that I cannot share the essayist's confidence as to the possibility of analyzing these impulses in any basic sense. I have not been impressed with the analyses that I have heard or have attempted to make. The analyses seem often to be whimsical and shallow, not to reach the fundamental pathogenesis. They are correct, no doubt, as laying bare some of the more immediate and proximate links in the chain of causation, but they fail to reveal the *primum movens*. Not infrequently the analysis overleaps itself or, as La Rochefoucauld puts it, "The fault with penetration is not that it does not penetrate, but that it penetrates too far."

We come nearer arriving at the truth by listening to the interpretations of poets and seers. Dr. Jelliffe, confirmed psychoanalyst, admits that the analyses are for those that creep, that the poet divines in a flash what the analyst laboriously strives for. Nor does the poet always tell all that he apprehends. Shakespeare in the soliloquy in "Hamlet" gives a marvelous rationalization of the arguments for suicide pro and con, but he carefully avoids permitting Hamlet to refer to the real reason why he does not commit suicide. The real reason, of course, is the reason that keeps a wounded cat or chicken from committing suicide, namely, the instinct to preserve life at whatever cost. Is it not true that the cause of suicide direct or indirect is a fundamental failure in this instinct to live? Is it not true that our analysis reaches only to the rationalization? Just as the orderly development of the embryo directed by the intuitive wisdom inherent in the egg sometimes suffers from a fatal change in this order and there develops instead of the symmetrical organism a monster, so the will to live may be altered and perverted by an antagonistic instinct to death which I can but regard as an ultimate datum not susceptible of further analysis.

Dr. Menninger (closing).—The psychiatrists are not pessimistic about the possibility of analyzing impulses in human beings. Poets and philosophers are more able to give hints about these tendencies than scientists. These matters are quite beyond the scope of laboratory methods. But I think the psychiatrists are more nearly allied to the poets than to the laboratory investigators. Nor is that as damning as it may sound to some. Our work is very largely verbalization; not pus and blood, but the whole verbalization of life is our material.

But with all due credit to the poets and philosophers, the difficulty in applying their observations to one's patients is that their material is not systematized. Freud realized many years ago that authors had recognized many facts about human nature that physicians and other scientists had missed, but he also saw that this insight had not been made available to the physician in practice. What psychiatry has been interested in for the last several years is bringing some of these intuitive facts into systematized form so that they can be used by physicians.

The work is not complete, but many cases have been analyzed in great detail so that we know, for example, just what causes self-mutilation. These researches do not appear in the *Journal of the American Medical Association*, but you will find them recorded in detail in some of our psychiatric and psychoanalytic journals. I could have presented one of these cases in more detail

today, but I purposely spared you because I preferred to give you a hasty general outline of the study I have been conducting for several years.

We not only know what causes some of these things, but we have formed some conclusions which have been utilized in therapy. For example, after we have determined the individual things that cause self-mutilation in a particular case, we can indicate what the next step is, to free the individual from these self-destructive impulses by assisting him to turn his aggressions outward toward the outside world instead of inward upon himself. That is the rationale of what psychiatrists are doing. Occupational and recreational therapy are not devices to keep the patient's hands busy and his mind occupied, but are much more specific treatment. We do not keep patients playing tennis just to keep them busy, but to enable them to turn their aggressions outward and thus relieve their need for expression of internal aggressions. That is why a ping pong game is sometimes more effective treatment than an appendectomy. These strong aggressions cannot be permanently relieved surgically. The patient is forced to make repeated sacrifices in which one organ is offered for another. But if he can be led to direct these aggressions outward in the form of sublimations he is on the road to health. Physicians can help him to do that only if they understand why the patient is trying to destroy himself in the first place. Therefore, I protest against the belief that we can never find out why these things are, and urge my colleagues to pursue with an open mind the solution of the riddle of indirect self-destruction.

HYPERTHYROIDISM COMPLICATED BY HEART DISEASE*

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The cardiovascular signs and symptoms of hyperthyroidism play such an important part in the syndromes of toxic goiter that hyperthyroidism is classified usually as one of the etiological causes of heart disease. This has received such general recognition that the more recent textbooks on cardiology include chapters on thyroid disease.

In this paper we shall not discuss the usual symptoms and signs of hyperthyroidism or even the cardiac symptoms and signs of this disorder. Instead, we wish to limit our discussion to cardiac disorders other than those of hyperthyroidism which we have seen as complications of hyperthyroidism. Sometimes these associated heart diseases may be more apparent than the hyperthyroidism itself, and the thyroid may be overlooked as an etiological factor in the heart failure. It is because these complicating diseases add to the difficulty in the diagnosis and medical management, and in the danger of surgical treatment of hyperthyroidism, that we consider this subject worthy of presentation. In order to demonstrate hyperthyroidism complicated by various other heart disorders, typical case histories illustrative of the various lesions under consideration will be presented.

First, however, for the sake of clearness and to prevent any possible misunderstanding, we will enumerate some of the more important cardiovascular signs and symptoms of uncomplicated hyperthyroidism. Palpitation, tachycardia and dyspnea are a part of the usual picture of hyperthyroidism. These are generally more apparent on exertion or excitement. Usually the tachycardia persists even while the patient is at rest. The heart shows little, if any, enlargement. There is a rather forcible apex beat, but no thrill. The mitral first sound usually is accentuated, as is sometimes the mitral second. There is frequently a systolic murmur that is heard best in the pulmonic area at the second intercostal space just to the left of the sternum. Auricular fibrillation is often present and sometimes auricular flutter is observed. Elevation of the systolic blood pressure also is seen rather frequently in hyperthyroidism. Edema of the lower extremities, hepatic engorgement, and ascites may occur. However, there are some[3] who believe that a heart does not fail from hyperthyroidism alone, and that when failure such as is evidenced by edema has occurred, there must be some other cardiac disease present. This will be discussed in more detail with *Case 1.*

For the most part, a toxic adenoma generally is considered to have more serious cardiac involvement than an exophthalmic goiter. For this reason it has been said that in exophthalmic goiter the nervous system bears the brunt of the disease and in adenomatous goiter with hyperthyroidism the heart suffers the most. This is often, but not always true.

EXOPHTHALMIC GOITER WITH RIGHT VENTRICLE FAILURE

Case 1.—Dr. H. B. S., aged 55 years, came to us December 2, 1930, with exophthalmic goiter and marked cardiac decompensation. The exophthalmic goiter had developed in 1923 and had remained untreated until he was seen by us. He had marked edema, ascites and liver engorgement. After rest in bed and the administration of Lugol's solution, ammonium nitrate and merselyl, a mercurial diuretic, he lost forty pounds

*Read in Section on Medicine, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*Space does not permit us to list the many signs and symptoms that distinguish exophthalmic goiter from toxic adenomata of the thyroid.

weight. This decrease in weight resulted from loss of the edematous fluid from his tissues. On December 27, 1930, although he still had a small amount of edema and ascites, a subtotal thyroidectomy was performed. Although it was necessary to continue both of the diuretics, ammonium nitrate and mersalyl, for several weeks, his recovery was uneventful. From then on no medication has been required. He has been able to resume his practice.

Failure of the right ventricle, as evidenced by peripheral edema, ascites and engorgement of the liver, is seen occasionally in severe thyrotoxicosis, and could be considered as a part of the picture of thyrotoxicosis. However, some believe that a normal heart will not fail from thyrotoxicosis alone,[3] and that when failure occurs some other cardiac disease, in addition to the hyperthyroidism, is present, even though it cannot be demonstrated clinically. The fact that edema is seldom seen in patients under forty years of age, but is found more frequently with hyperthyroidism in patients over forty, and at the period of life that degenerative lesions such as hypertension and coronary sclerosis are most prevalent, is evidence that hearts do not fail from hyperthyroidism alone.

Not infrequently the cardiac decompensation is the thing which first attracts the attention, while the hyperthyroidism is overlooked entirely, unless a careful thyroid examination is made. Any patient with cardiac decompensation who has lost in weight (edema otherwise causes an increase in weight), or who has a high pulse pressure or auricular fibrillation, should have a careful examination for thyrotoxicosis. The other associated heart disorders may not of themselves be amenable to treatment, but satisfactory control of the hyperthyroidism will generally bring about a return of compensation and take a large part of the load off the crippled heart.

EXOPHTHALMIC GOITER WITH LEFT VENTRICLE FAILURE (PAROXYSMAL TACHYCARDIA WITH PULMONARY EDEMA)

Case 2.—On June 5, 1927, at the age of 36 years, Mrs. W. R. C. had a subtotal thyroidectomy for exophthalmic goiter. A recurrence of the exophthalmic goiter was noticed in September, 1928. She was observed for several months and then was advised to submit to a second thyroid operation. This she declined, and was not seen again by us until one of us was called to see her at her home on December 15, 1933. She was suffering from a severe attack of pulmonary edema. From her history it was apparent that the acute pulmonary edema had been produced by an attack of paroxysmal tachycardia. She was seen at the time to have a large recurrent exophthalmic goiter and to be definitely stimulated, in spite of the fact that her physician had even given her ten minims of Lugol's solution four times daily. She was given atropine sulphate and morphine sulphate by hypodermic injection for the acute pulmonary edema. Three grains of quinidine sulphate were administered every six hours, day and night, to prevent further attacks of pulmonary edema. Her pulmonary edema was chronic in nature, so it was necessary to give her 30 grains of ammonium nitrate three times daily, by mouth, during most of the preoperative period and a mersalyl diuretic intravenously several times. This was the only means by which the pulmonary edema could be controlled. An electrocardiogram taken on December 13, 1933, showed deep Q_2 and Q_3 and a deeply inverted T_3. Q_3 was greater than R_3 and no S_3 was present. Aside from the fact that the QRS complex was not of small amplitude in lead one, this electrocardiogram was indicative of old right coronary artery occlusion.[2 12] The Q_3 was the type that Pardee[6] described as significant. Thus coronary sclerosis was an additional etiological factor in this case and probably accounted for the weak left ventricle and resulting pulmonary edema. The quinidine and Lugol's solution were continued and her weight and strength gradually improved. On May 1, 1934, it was decided that her general condition was as good as it ever would be, so a left lobectomy was performed. A large recurrent left lobe of the thyroid was removed. Although the right lobe was smaller, it was not thought advisable to resect it at that time. The patient developed pulmonary edema again almost immediately after the operation. Four grains of quinidine sulphate were given every four hours for the first forty-eight hours after the operation, and then the dosage was reduced to four grains every six hours. Ammonium nitrate and an intravenous mercurial diuretic were again necessary to clear up the pulmonary edema. The pulmonary congestion returned on several occasions during the next two months. On this account it was necessary to administer ammonium nitrate most of the time and once to give another intravenous injection of mersalyl. A right lobectomy was performed on September 24, 1934. Since then a decided improvement has been noticed.

Chronic left ventricle failure, with pulmonary edema, is a serious and, fortunately, a comparatively rare complication of the toxic thyroid. We have recently operated upon another patient, similar to *Case 2*, in whom there was preoperatively a chronic pulmonary edema associated with an exophthalmic goiter. In this patient, also, there has been some tendency to a recurrence of the pulmonary edema since the subtotal thyroidectomy. In both of these cases the postoperative administration of ammonium nitrate and intravenous mersalyl was necessary until sufficient compensation was restored.

These cases offer a poor prognosis. It is evident that there was present some other cardiac disease in addition to the hyperthyroidism. In both of these cases the history and other findings suggest that a sclerotic process in the coronary arteries was responsible for the left ventricle failure.

ADENOMATOUS GOITER WITH HYPERTHYROIDISM ASSOCIATED WITH ESSENTIAL HYPERTENSION

Case 3.—Mrs. C. C. S., aged 46 years, was seen in consultation with Dr. George Carlisle, of Dallas. She had had a thyroid operation three years previously without apparent benefit. The history obtainable indicated that she had had an adenomatous goiter at that time. When examined by one of us on December 26, 1934, both lateral lobes of the thyroid were found to contain multiple adenomata. A few days previously her pulse rate was reported as 120 per minute, the basal metabolism was plus 28 per cent, the systolic blood pressure equal to 180 mm. of mercury and the diastolic to 150 mm. When we saw this patient, the blood pressure equaled 170 mm. of mercury, systolic, and 130 mm. diastolic. The left border of the heart at the apex was 4.5 inches to the left of the midsternal line. The examination revealed no other significant findings except tortuosity of the retinal arteries and compression of the retinal veins wherever they were crossed by the arteries. There were no hemorrhages or exudates and there was no edema of the discs. With the Mosenthal test the urine only concentrated to specific gravity of 1.007. In spite of this she had no nocturnal frequency and the blood urea, uric acid and creatinine were normal. The patient was considered to have an adenomatous goiter with hyperthyroidism and an advanced essential hypertension. Thyroidectomy was advised.

Elevation of the systolic blood pressure is a frequent finding in uncomplicated hyperthyroidism. However, the diastolic pressure does not become elevated. This frequently results in an increased pulse pressure. If the diastolic pressure is elevated above 100 mm. of mercury it can be assumed that the patient has a true hypertension in addition to hyperthyroidism. Where the systolic pressure is increased, but the diastolic pressure is not raised above 100 mm. of mercury, the blood pressure elevation is probably due entirely to hyperthyroidism, but one cannot be certain of this until after a subtotal thyroidectomy has been performed. In *Case 3* the diastolic pressure is equivalent to 130 mm. of mercury. It may be safely said that this patient has a definite hypertension, as well as hyperthyroidism. It is not anticipated that the blood pressure will be altered appreciably by thyroidectomy.

EXOPHTHALMIC GOITER AND ANGINA PECTORIS

Case 4.—Mr. R. A., aged 41 years, came to us on April 10, 1934, with a typical exophthalmic goiter of three months' duration. He had a definite exophthalmos, heat intolerance, loss of weight in spite of an increased appetite, and a diffusely enlarged thyroid gland. Two months previously, and after his exophthalmic goiter was well developed, some one had advised him that he needed more exercise. He followed out this advice and noted that exercise caused substernal pain. The pain did not radiate down the arms, but was noticed to come on on exertion and to be relieved promptly by rest. After about a month he discontinued this exercise. He had no more substernal pain during the month preceding his appearance at our office. Ten minims of Lugol's solution were administered four times a day for twenty-three days. Then a subtotal thyroidectomy was performed on May 3, 1934. No evidence of hyperthyroidism or deficient circulation of the coronary arteries has been observed since the operation.

Case 4 illustrates angina pectoris which was brought on only by strenuous exercise in an individual in whom the heart was already laboring from the increased work produced by hyperthyroidism. In this case avoidance of heavy work, alone, was sufficient to prevent the anginal attacks. Since thyroidectomy, forced exertion has not caused substernal pain.

Case 5.—Miss A. T., aged 28 years, first came to us January 30, 1933, with evidences of a mild exophthalmic goiter. The outstanding symptoms were tachycardia, nervousness, exhaustion, increasing prominence of the eyes, loss of weight and diffuse thyroid enlargement, especially of the right lobe. These symptoms had begun six months previously. In addition, she had noticed precordial pain, with pain radiating down the left arm and extending to half-way between the elbow and wrist. This pain was increased by exertion and improved by rest. Two months later, when she returned, the exophthalmic goiter symptoms had increased in severity. After the administration of ten minims of Lugol's solution three times a day for ten days, she responded with the usual clinical improvement and likewise ceased to have anginal pain on ordinary exertion. On one occasion we were able to induce the substernal pain with its radiation down the left arm by having the patient exercise strenuously. An electrocardiogram was taken before and during this induced anginal attack. There were no distinct changes in the electrocardiogram during the induced anginal attack.[10] A left axis deviation was the only abnormal finding in these electrocardiograms. Subtotal thyroidectomy was performed April 19, 1933. Some dull pain, extending across the lower part of the chest anteriorly and radiating to the left arm, was experienced on the following day. No anginal pain has been noticed since.

This case illustrates angina pectoris in association with exophthalmic goiter. The angina pectoris was relieved by the administration of Lugol's solution, but could be brought on by strenuous exercise and was induced by subtotal thyroidectomy. We have seen a number of cases of coexisting exophthalmic goiter and angina pectoris in which the anginal attacks were completely relieved by Lugol's solution. That the electrocardiogram showed no definite changes during the induced anginal attack does not exclude angina pectoris, for only about 50 per cent of the cases with angina pectoris show distinctive electrocardiographic changes during the induced attack.[4 8 10 12] Fortunately, subtotal thyroidectomy is a comparatively safe operation in these cases, because the angina pectoris can be relieved preoperatively by the administration of Lugol's solution. None of the other

cases of this type observed by us developed any substernal pain during the postoperative thyroid reaction.

EXOPHTHALMIC GOITER WITH ANGINA PECTORIS AND MYOCARDIAL INFARCTION

Case 6.—Mrs. H. B. B., aged 45 years, came to us September 19, 1932. She had noticed a gradually increasing shortness of breath, beginning with an attack of influenza five years previously. During the six months preceding her visit, she had developed typical signs of exophthalmic goiter such as thyroid enlargement, nervousness, loss of weight, weakness of the quadriceps muscles, tremor, palpitation, and heat intolerance. In addition, she had noticed substernal pain which often came on at rest and after meals, and was sometimes relieved by belching. The pain did not radiate down the arms. It could be brought on by exertion. Walking only two blocks would induce this pain. It was relieved by five minutes' rest. The physical examination was consistent with the above history. The examination of the blood showed the hemoglobin as 80 per cent and the erythrocytes as 3,500,000 per cu. mm. The electrocardiogram showed T-wave inversion in leads two and three. The T-waves were not of the coronary type. The basal metabolism was reported as plus 20 per cent. Because of the marked electrocardiographic changes and the fact that this patient had had considerable substernal pain while at rest, it was believed that she had had a myocardial infarction previously. She was given ten minims of Lugol's solution three times daily. In four days her attacks of angina pectoris subsided. Her secondary anemia was also treated and the erythrocyte count was elevated to 3,912,000 per cu. mm. of blood. Subtotal thyroidectomy was performed on October 20, 1932. No operative or postoperative difficulties were encountered. She has had no further angina pectoris. On December 30, 1932, the erythrocytes in the blood numbered 4,360,000 per cu. mm. An electrocardiogram on March 28, 1933, showed only an inverted T-wave in the third lead. An examination on October 22, 1934, showed an erythrocyte count of 3,400,000 per cu. mm. of blood. The basal metabolism was minus 22 per cent. There has been no angina pectoris since the subtotal thyroidectomy.

The angina pectoris in this case evidently was influenced by three factors, sclerosis of the coronary arteries, secondary anemia, and hyperthyroidism. It is evident that none of these factors alone was sufficient to produce the anginal attacks. The secondary anemia was probably not an important factor, as the anginal attacks disappeared before much improvement had been made in the blood. Lugol's solution promptly relieved her of the angina pectoris at the same time that it diminished the thyroid intoxication. If there had not been some underlying deficiency of the coronary circulation the hyperthyroidism undoubtedly would not have produced these attacks. We believe that this patient actually had had a coronary occlusion some time previously, but from her history we were not able to determine the exact time of that event. There was nothing in the history or examination to indicate that the elecrocardiographic changes in leads two and three were indicative of right ventricle strain.[1] The electrocardiogram could, therefore, be considered to be of the T_3 type described by Barnes and Whitten[2] as associated with infarction in the posterior basal portion of the left ventricle or posterior part of the interventricular septum. The fact that the patient had had so much pain while at rest was also somewhat suggestive of infarction. Furthermore, an electrocardiogram taken about six months later showed that a low upright T_2 had replaced the inverted T_2 seen in the first electrocardiogram. This slow return of the electrocardiogram to normal is seen usually following myocardial infarction.

ADENOMATOUS GOITER WITH HYPERTHYROIDISM ASSOCIATED WITH ANGINA PECTORIS AND MYOCARDIAL INFARCTION

Case 7.—Mrs. W. S. H., aged 55 years, was seen by us on January 20, 1933. She had had thyroid enlargement for ten years. She complained of nervousness, loss of weight, and spells of dyspnea, palpitation and tachycardia. Six weeks previously she had suffered from a severe pain in the front of the chest with radiation into the neck and down both arms. The pain was so severe that it required two hypodermic injections of morphine to give her relief. From this time on, exertion produced substernal pain with radiation down the right arm. The basal metabolism test was plus 34 per cent and the blood pressure reading was 175 mm. mercury, systolic, and 80 mm. diastolic. She was given Lugol's solution because some of her symptoms suggested exophthalmic goiter (stimulation and heat intolerance) as well as definite toxic adenomata. Lugol's solution failed to produce any improvement of either her hyperthyroidism or her angina pectoris. Subtotal thyroidectomy was performed on April 12, 1933. The pathological diagnosis of the tissue removed was cystic fetal adenomata of the thyroid. Shortly after the thyroidectomy she again developed substernal pain, which lasted for two days. This was definitely a myocardial infarction. Her pulse became rapid and irregular. An electrocardiogram proved this disturbance of rhythm to be due to auricular fibrillation. On April 20, 1933, she was started on quinidine sulphate (2 grains every six hours). The auricular fibrillation stopped on April 25, 1933, so the quinidine was discontinued. No more substernal pain was experienced. She was kept in bed for about a month and then allowed to increase her activities gradually. She has not had any angina pectoris since, in spite of the fact that she is doing her own house work.

From the history it is evident that this patient had a long standing adenomatous goiter which became toxic after a time, but caused her no serious inconvenience until an attack of myocardial infarction occurred six weeks before she came to us. Following this severe attack she suffered from paroxysms of angina pectoris. In the exophthalmic goiter cases complicated by angina pectoris we were able to re-

lieve the angina pectoris before operation in all cases by the administration of Lugol's solution. However, in this case, in which the hyperthyroidism was produced by a toxic adenoma, Lugol's solution was not beneficial, as toxic adenomata do not respond to iodine treatment. Consequently, this patient entered the operating room still suffering from attacks of angina pectoris on exertion, and it is not surprising that she developed a coronary occlusion postoperatively. Angina pectoris is a much more serious complication in toxic adenomata than in exophthalmic goiter. We have operated upon a similar case recently. This last case did not have any postoperative complication, although we were not able to get her free from anginal attacks before the operation. We have another similar case which has not been operated upon yet. In the two cases that have been operated upon, subtotal thyroidectomy has removed the load on the heart produced by the toxic thyroid. This has apparently relieved the work of the coronary arteries sufficiently that these vessels have become adequate to meet the needs of the heart during exertion, for neither of these patients now has angina pectoris. The risk of operation in cases of this type is not small, but without operation the prognosis is poor, as the thyroid toxicity generally increases as time goes on. Furthermore, the sclerosis of the coronary arteries is apt to become more extensive as time elapses. Both of these factors have been shown to aggravate the existing angina pectoris.

EXOPHTHALMIC GOITER AND MITRAL STENOSIS

Case 8.—Mrs. C. H. E., aged 32 years, was seen October 20, 1933. She complained of loss of weight, dyspnea, and tachycardia of one month's duration. The basal metabolism was reported as plus 30 per cent. The thyroid gland was enlarged diffusely and was about one and one-half times the normal size. She had had an elevated afternoon temperature for several weeks and her temperature was recorded as 99.6° on examination. Roentgenograms of the lungs showed no evidence of tuberculosis. Examination of the heart revealed an active apex beat, but no thrill, an accentuated first heart sound at the apex, a definite presystolic murmur at the apex, and the pulmonic second sound equal to the aortic second in intensity. The systolic blood pressure was recorded as equal to 120 mm. of mercury and the diastolic as 80 mm. On the basis of the heart findings and fever a diagnosis of active mitral stenosis was made. The patient was given 20 c. c. of the bovine type of *Streptococcus cardio-arthriditis* serum (Small) intramuscularly on October 27, 1933. Following this, she had no more afternoon fever. Subtotal thyroidectomy was performed on November 4, 1933. Convalescence was uneventful. *Streptococcus cardio-arthriditis* antigen (Small) was given twice weekly until July 1, 1934. The presystolic murmur was heard until June 2, 1934. After this time it could not be heard while the patient was in a reclining position or a sitting position or after exercise. It was heard again on November 4, 1934. There was also a slight cardiac hypertrophy and a definite tachycardia, so it was thought advisable to start the *Streptococcus cardio-arthriditis* antigen again.

The rapid heart rate, active apex impulse, accentuated mitral first sound, palpitation and dyspnea in this case could have been produced by either the mitral stenosis or the exophthalmic goiter. The elevated basal metabolism and diffuse thyroid enlargement indicated exophthalmic goiter. Only the fever and the presystolic murmur were diagnostic of the active infection in the mitral valve. We[9] have found the *Streptococcus cardio-arthritidis* serum and antigen of Small effective in quieting the infection in active endocarditis, whether acute or chronic. The speeding up of the heart provoked by the hyperthyroidism may have made the presystolic murmur more apparent in this case. The active process in the mitral valve was also a factor as the presystolic murmur remained for at least four months following the subtotal thyroidectomy and returned again after the antigen treatment had lapsed for several months. The operative interference for this patient's hyperthyroidism and the serum and antigen for her active endocarditis both aided her considerably.

EXOPHTHALMIC GOITER WITH AORTIC REGURGITATION

Case 9.—Mr. R. W. V., aged 30 years, was seen first on January 25, 1933. He had had rheumatic fever at the age of 14 years and had been troubled with palpitation from that date. Eighteen months previous to his appearance for examination he began to develop signs of exophthalmic goiter, such as loss of weight, nervousness, palpitation, dyspnea, tachycardia and exophthalmos. Examination showed a diffuse bilateral thyroid enlargement and an enormously enlarged heart with a loud diastolic aortic murmur and a presystolic murmur at the mitral orifice. There was a weakly positive Wassermann test and a history of previous treatment for syphilis. Although we could not be certain whether the etiological factor in his cardiac disease was syphilis or rheumatic fever, it was thought to be the latter, because of the development of cardiac symptoms at an earlier age than one would have expected a syphilitic heart disease to appear. In addition, there was some evidence of mitral valve disease, although the diastolic murmur heard at the mitral area could have been an Austin Flint murmur. After preoperative preparation with Lugol's solution, subtotal thyroidectomy was performed on February 21, 1933. Due to the development of bronchopneumonia, a severe, but brief, postoperative reaction followed. Although his heart has remained enlarged, he has been feeling better since the thyroidectomy, and has been able to carry on his regular work.

This is another example of a toxic goiter combined with serious organic heart disease in which the compensation of the heart has been improved by thyroidectomy. This man's heart was severely damaged from aortic regurgitation and he could not have lived long if the additional

strain produced by the exophthalmic goiter had not been removed. His postoperative reaction was severe, but as usual with these patients, he was able to survive in spite of a badly crippled heart.

EXOPHTHALMIC GOITER WITH INCOMPLETE BUNDLE BRANCH BLOCK

Case 10.—Mr. S. S. B., aged 58 years, came to us on December 16, 1933. He had not been well since an attack of influenza in February, 1931. Since then he had had nervousness, tachycardia, tremor, loss of weight, marked heat intolerance and increased appetite. He had a marked exophthalmos and other typical findings of exophthalmic goiter. The systolic blood pressure was recorded as equal to 147 mm. of mercury and the diastolic as 70 mm. There was a diffuse enlargement of the thyroid. It was three times the normal size. The heart was not enlarged. An electrocardiographic tracing showed an incomplete bundle branch block with a QRS interval of 0.12 seconds in all three leads. He was given 10 minims of Lugol's solution four times a day until January 23, 1934, when a subtotal thyroidectomy was performed. His recovery was uneventful.

Bundle branch block (interference with the conduction through one of the branches of the bundle of His) indicates that definite myocardial damage has occurred. It usually is produced by a lesion of the coronary arteries and may have been in this case, as the blood pressure was not elevated. Hyperthyroidism probably was not a factor, for the lesion persisted after the thyroidectomy. In our experience, bundle branch block usually persists after thyroidectomy, in contradistinction to auricular fibrillation, which usually disappears following thyroidectomy.

We do not believe that bundle branch block is a contraindication to all but emergency surgery, as reported by Herrmann. Although the average individual, according to some writers, does not live long after the development of bundle branch block, some live for many years with this defect without any apparent discomfort. Each case must be decided for itself. If the patient has a history of a recent coronary occlusion or is having definite anginal attacks, operation will carry a comparatively high mortality rate. If, however, the patient is up and about and carrying on his regular activity and able to do a reasonable amount of exercise, and has no anginal pain on exertion, we believe that in most cases operation can be performed without a great deal of increased risk. Certainly, when complicated by hyperthyroidism, we believe thyroidectomy should be performed, if possible, in order to take as much load as possible off of the heart.

SUMMARY OF MEDICAL TREATMENT

A number of case histories have been reported to show that if proper preoperative medical care is exercised thyroid surgery can be done when hyperthyroidism is complicated by other serious cardiac disorders. In exophthalmic goiter it has been shown that the administration of Lugol's solution, as used routinely in preparation for thyroidectomy, usually produces a decided increase in the cardiac compensation and makes surgery relatively safe. However, in the toxic adenoma Lugol's solution is not beneficial, and therefore not as much can be done to decrease the danger of thyroidectomy. When exophthalmic goiter is complicated by angina pectoris, Lugol's solution usually will stop the angina pectoris. When adenomatous goiter with hyperthyroidism is associated with angina pectoris, Lugol's solution is of no benefit and thyroidectomy must be undertaken without having the angina pectoris under control.

In right ventricle failure, with edema, ascites or liver engorgement, it may be necessary to use diuretics such as ammonium nitrate and mersalyl. We obtain the best results if we give 30 grains of ammonium nitrate three times daily for three full days before giving mersalyl intravenously. The combined use of these two drugs usually will produce marked diuresis and loss of edema. If further diuresis is necessary, the ammonium nitrate may be continued indefinitely and the mersalyl can be given safely intravenously in one or two c. c. doses every third day, providing that there is no hematuria. Digitalis should never be given preoperatively, as Plummer[7] has shown that the surgical mortality rate is almost ten times as great when this drug is used.

In left ventricle failure with pulmonary congestion or edema we have found the diuretics, ammonium nitrate and mersalyl, to be beneficial when used as described above in the treatment of the peripheral edema of right ventricle failure. If paroxysmal tachycardia is a factor in the production of the pulmonary edema we have found it advisable to use two to four grains of quinidine sulphate every four or six hours, day and night, to prevent further attacks of paroxysmal tachycardia.

Where hyperthyroidism is associated with active endocarditis we generally have administered *Streptococcus cardio-arthritidis* serum and antigen to control the active endocarditis prior to thyroidectomy.

Regardless of whether or not hyperthyroidism

is complicated by any other heart disease, we have insisted that patients with exophthalmic goiter be submitted for thyroidectomy only after their stimulation has been controlled as much as possible by Lugol's solution. In other words, the hyperthyroidism must be under the control of Lugol's solution to prevent the dangerous postoperative crisis, which is apt to occur in patients not sufficiently prepared with this iodine solution. It is almost as important to be sure that the patient's strength has returned sufficiently before undertaking operative interference. To test the patient's strength, he is asked to step up on the seat of an ordinary straight chair. Any weakness of the quadriceps muscles, as demonstrated by this test, indicates that the patient is not ready for thyroidectomy.

CONCLUSIONS

(1) Careful preoperative medical treatment of hyperthyroidism makes thyroid surgery possible, even when there are other serious cardiac complications.

(2) When two or more cardiac diseases, one of which is hyperthyroidism, are contributing to the decompensation of the heart, the compensation can be increased if the hyperthyroidism is controlled by thyroidectomy.

(3) Left ventricle failure is a more serious complication of hyperthyroidism than right ventricle failure. Fortunately, the latter is the more frequent.

(4) Angina pectoris and myocardial infarction are serious complications of hyperthyroidism, especially if the hyperthyroidism is due to toxic adenomata of the thyroid.

(5) Bundle branch block is not necessarily a contraindication to thyroid surgery. This lesion generally persists following thyroidectomy.

REFERENCES

1. Barnes, A. R.; and Whitten, M. B.: Study of the T-Wave Negativity in Predominant Ventricular Strain. Amer. Heart Jour., **5**:14-67, 1929.
2. Barnes, A. R.; and Whitten, M. B.: Study of the R-T Interval in Myocardial Infarction. Amer. Heart Jour., **5**:142, 1929.
3. Ernstene, A. C.: The Heart in Hyperthyroidism. Med. Clin. N. Amer., **17**:923-937, 1934.
4. Feil, H.; and Siegel, M. L.: Electrocardiographic Changes During Attacks of Angina Pectoris. Amer. Jour. Med. Sci., **175**:255, 1928.
5. Herrmann, G.; and Herrmann, L. G.: Cardiac Disorders in Surgical Patients. Texas State Jour. Med., **30**:183-191, 1934.
6. Pardee, H. E. B.: Significance of Electrocardiogram with Large Q-Wave in Lead Three. Arch. Int. Med., **46**:470, Sept., 1930.
7. Plummer, H. S.: Personal communication.
8. Siegel, M. L.; and Feil, H.: Electrocardiographic Studies During Attacks of Angina Pectoris and of Other Paroxysmal Pain. Jour. Clin. Invest., **10**:795, 1931.
9. Whitten, M. B.: Antistreptococcus Cardio-arthritidis Serum and Antigen in the Treatment of Chronic Rheumatic Endocarditis. Texas State Jour. Med., **28**:217-223, 1932.
10. Whitten, M. B.; and Herndon, J. H.: Changes in the Electrocardiogram Resulting from Induced Attacks of Angina Pectoris. In press.
11. Wilson, F. N.; MacLeod, A. G.; Parker, P. S.; Johnston, F. D.; and Klostermeyer, L. L.: The Electrocardiogram in Myocardial Infarction with Particular Reference to the Initial Deflections of the Ventricular Complex. Heart, **16**:155, 1933.
12. Wood, F. C.; and Wolferth, C. C.: Angina Pectoris: The Clinical and Electrocardiographic Phenomena of the Attack and Their Comparison with the Effects of Experimental Temporary Coronary Occlusion. Arch. Int. Med., **47**:339, 1931.

DISCUSSION (*Abstract*)

Dr. D. W. Carter, Jr., Dallas, Tex.—Dr. Whitten has discussed the association of hyperthyroidism with eight distinct heart lesions. Time will not permit of comment on each of these. I should like to confine my remarks to a few statements about the effect of thyrotoxicosis upon the circulation and the myocardium.

In order to meet the increased metabolic needs in hyperthyroidism, the tissues of the body must be supplied with an increased amount of blood per minute. This is accomplished principally by changes in pulse rate, minute volume output of the heart and velocity of blood flow, all of which are increased roughly in proportion to the elevated basal metabolic rate. As a result, blood flow in hyperthyroid patients at rest is equivalent to the flow in normal persons during moderate exercise, and to this extent the resting circulatory reserve is encroached on by thyrotoxic patients. Plummer and Boothby observed that the cost of work is increased in hyperthyroidism. A given amount of work is accompanied by an abnormal rise in the metabolic rate which necessitates a corresponding abnormal increase in blood flow and pulmonary ventilation. In addition, the vital capacity usually is diminished in patients with hyperthyroidism and the degree to which pulmonary ventilation can be increased during exercise without the production of dyspnea therefore is reduced. These factors account for the fact that relatively little exercise may produce symptoms in thyrotoxic patients equivalent in severity to those observed in normal subjects only after severe and prolonged exertion.

None of the physical findings ordinarily observed is to be interpreted as evidence of myocardial damage. The heart is performing an increased amount of work in order to meet the increased metabolic needs of the body. At the same time, the metabolic rate of the myocardium presumably is elevated along with that of the tissues in general, and the cost of cardiac work is probably increased just as is the cost of work by skeletal muscles. These factors adequately explain the hyperactivity of the heart and the accompanying physical signs.

It has been shown that the administration of thyroxine to an animal so alters the metabolism of the myocardium that:

(1) The heart beats at an enhanced rate for hours after isolation.

(2) The oxygen consumption of the heart is increased, and

(3) The glycogen content of the cardiac muscle is di-

minished and in certain instances the lactic acid content is increased.

Myocardial failure may supervene when the load thrown upon the heart exceeds or approaches the limits set by its own metabolism.

There is no evidence in the literature to disprove the fact that a heart that is induced to work more rapidly with an increased volume output in the presence of increased pressure and metabolism may not exhaust its nutrition and respond with morbid anatomical changes that may be erroneously ascribed to the pernicious impingement of thyroxine on the myocardium.

The increased burden may cause angina in a previously diseased heart.

A histological study by Andrus of the myocardium of twenty-seven patients dying of hyperthyroidism revealed a normal myocardium in fourteen instances, slight changes in eight. In five that showed profound changes evidence of other factors (syphilis, rheumatic fever) was present.

It is perhaps the most accurate, and certainly the most optimistic attitude, to look upon the heart in hyperthyroidism as suffering from its own accelerated metabolism and from the load thrown upon it by the metabolism of the body as a whole. From both of these burdens it can happily be relieved by relief of the hyperthyroidism.

Dr. Whitten (closing).—It has been emphasized that postmortem examinations of patients dying of uncomplicated hyperthyroidism do not show gross lesions in the heart. The lack of postmortem evidence of heart lesions in uncomplicated hyperthyroidism is one of the reasons why many believe heart failure is not a part of the picture of hyperthyroidism alone, but indicative of the presence of some other cardiac disease or defect, even though it may be clinically unrecognizable.

The question of the use of *Streptococcus cardio-arthritidis* serum and antigen in the treatment of rheumatic endocarditis has been brought up, and I have been asked how frequently I have observed valve lesions to disappear on this treatment as in *Case 8* of the present series. Not enough work has been reported on *Streptococcus cardio-arthritidis* serum and antigen (Small). Many well known cardiologists who condemn the use of this serum and antigen, on questioning have admitted that they have never used them. I have believed them specific, not only for acute rheumatic fever, but also for chronic rheumatic endocarditis. I consider a rheumatic infection of the heart valves to be a chronic infection persisting throughout life, even more so than syphilis. I consider the constant infection to be the cause of progressive stenosis or other valve deformities. Rheumatic fever is usually active even though the fever is low, as in *Case 8*, or even absent. I believe cardiac failure often is another sign of active rheumatic infection as I have seen compensation improve whenever the *Streptococcus cardio-arthritidis* serum or antigen was given and decompensation begin to develop when it was discontinued for several months. I have watched this occur over and over in a number of patients, whom I have then finally placed on *Streptococcus cardio-arthritidis* antigen continuously. In several cases the diastolic murmur has disappeared on this treatment and returned a few months after treatment was discontinued. Some murmurs have apparently disappeared completely. We recognize the fact that the presystolic murmurs of mitral stenosis cannot always be demonstrated, but believe we have seen these murmurs disappear too frequently to be considered accidental.

Patients with chronic rheumatic endocarditis are highly sensitive to the antigen and minute doses must be given. Reactions are produced if too large a dose is administered. Most of our reactions have been evidenced by a substernal or anterior chest pain on the day following the injection. A reaction is not beneficial and is apt to be harmful. The dose must be less than that which will produce a reaction.

UNDULANT FEVER*

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Undulant fever, or brucellosis, or brucelliasis, or brucella infection in the human, is the great simulator in the disease family. This is so true that the aphorism of the great Osler regarding syphilis might well be changed to read, "Know undulant fever in all its manifestations, and you know medicine."

The protean nature of undulant fever as a disease entity, both from the standpoint of symptomatology and pathology, was recognized by only a few physicians until very recent years. This lack of general knowledge about the disease is well shown by an incident in the Massachusetts General Hospital less than two years ago. In discussing a case of continued fever with pain in the back before a class of medical students, the eminent Richard Cabot[1] said:

"I have seen very few cases of undulant fever, only a few reported in the journals. It is conceivable that because I know so little about undulant fever this could be that disease."

Progress in general information about a new disease is not unlike the driving of a new automobile. The motor being started, the machine is put in low gear. It runs at a slow rate for a variable length of time and distance, depending largely on the condition of the road and the proclivities of the driver. Next it is put in second and goes at a faster speed, and finally high gear is reached and the machine runs over the highway at a merry clip.

Undulant fever is no exception. When Bruce,[2] in 1886, discovered *Brucella melitensis*, and Bang,[3] in 1897, discovered *Brucella abortus*, our information was slowly but surely getting

*Read in Clinical Session, Medical, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

under way. Then, in 1917, Alice Evans[4] gave our knowledge a real impetus by showing that the two organisms were practically the same. Finally, Keefer,[5] in 1924, reported the first case of undulant fever in a patient who had not been infected by goats. Since that time our information has increased rapidly and during the past few years nearly every medical journal has carried reports of cases of undulant fever of the three varieties: bovine, porcine, and caprine.

We now know that undulant fever is endemic in every state in the Union and in practically every country in the world. Several epidemics have been reported. Many states do not make undulant fever reportable, but in spite of this, 1,787 cases were reported in 1933.

The increase of undulant fever in this country is probably more apparent than real because of the increased acumen of the American physicians during recent years. Undulant fever is a very deceptive disease and therefore it is hard to diagnose.

If we are to find the majority of cases of this disease, we must constantly be looking for it. We must become undulant fever conscious. By this attitude only can we keep from overlooking many positive cases.

The diagnosis of undulant fever is made largely by the same methods that we use in diagnosing all other diseases. Our conclusions must be based on the history of exposure, the symptoms, the signs, and the laboratory reports. It is only by a correlation of the data secured by all of these investigations that we can hope to make a sound deduction.

It has been definitely proven that human cases of undulant fever result from acquiring the Brucella organisms from infected animals or from infective material from them. It is, then, important in the history to elicit data with reference to exposure. Has the patient been using raw dairy products, especially cream and milk; has he been handling raw meat, especially pork; and finally, does his work require contact with animals which may be infected, such as cattle, hogs, sheep and goats? The most common source of infection is drinking raw milk and cream from infected cows. Beattie and Rice[6] certainly lend great weight to this opinion in reporting an epidemic which occurred in Council Bluffs, Iowa, last spring. There was an epidemic of thirty cases. Twenty-seven of these were drinking milk from the same dairy. The herd was found infected and the Brucella organisms of the porcine variety were found in the cream from one of the infected cows. The epidemic stopped immediately after the sale of the infected milk was forbidden.

There is no symptom or syndrome pathognomonic of undulant fever. The clinical picture is that of infection. The organisms are carried into the body by the mouth; by the skin, abraded or intact; by the conjunctiva; and perhaps by inhalation, and a bacteremia results. The organisms then fix themselves in one or more organs of the body and apparently these secondary foci serve as reservoirs for recurring infection. Every system in the body is more or less involved in symptoms, but a few seem to bear the brunt of the attack. These characteristics make undulant fever the great simulator of diseases and explain why nearly every case is first treated for something else. The diseases most often confused with undulant fever are malaria, typhoid fever, tuberculosis, arthritis, influenza and tularemia.

There are two clinical types of the disease: acute and chronic, or ambulatory. The chief differences in these are the severity and duration of the symptoms. Acute cases show higher fever and more prostration and run an average course of about eleven weeks. Chronic cases show a very low grade fever and milder general symptoms and may continue for several years with recurring exacerbations and remissions. Many people show serological evidence of infection with no history of clinical symptoms.

The ordinary acute case comes on rather suddenly with chills or chilly sensations with fever, headache, sweats and general aches and pains. The temperature curve is of the remittent type and may reach a peak of 101 to 104° F. The course of the fever may be of the undulant type, but just as often is not. Night sweats are often of the drenching variety and some writers have stressed the peculiar fetid odor. The pulse rate is slower than the temperature elevation would indicate. Fatigue and loss of weight are quite common.

The nervous system seems to bear the brunt of the attack. Insomnia, depression, irritability and apprehension are the most prominent manifestations. Gilbert and Coleman[7] mention a patient who lost the sight of the right eye from a neuroretinitis. One of my patients now shows a mild involvement of this same type in the left eye. Evans[8] thinks that chronic brucellosis should be eliminated before a diagnosis of neurasthenia is justified. Hartley, Millice and Jor-

dan[9] recently reported a case of undulant fever meningitis with recovery.

The gastro-intestinal symptoms are not very marked as a rule, but there may be nausea, vomiting, epigastric fullness, abdominal pains, constipation or diarrhea. Hemorrhage from the bowel occasionally occurs.

The locomotor system is perhaps next to the nervous system in symptomatology; arthralgia, arthritis, spondylitis and myalgia are frequently encountered.

Symptoms in the respiratory tract are not very common, but occasionally chest pains, non-productive cough and physical signs of bronchopneumonia are manifested.

The physical examination of these patients is very disappointing. One complaining of so many ailments should certainly have more objective evidence to substantiate them. It is not unusual, however, to find nothing. In my own experience an enlarged spleen or an inflamed joint are the most frequent objective signs elicited.

We must, then, in our bewilderment, seek the help of the laboratory for guidance. The one infallible proof is the cultivation of the organism from the blood or from the excretions.

Unfortunately this is not always easy or practicable. The technical difficulties are considerable and negative results in active cases are quite frequent. Huddleson and Johnson[10] make the following statement:

"One or more negative blood cultures do not rule out abortus or suis. On the other hand, if the causative species is melitensis, the culture, if made during a pyrexial period, will invariably be positive."

Since the melitensis variety is much less common in this country the culture method is not very helpful.

The most helpful laboratory procedures are tests for the agglutinating power of suspected sera and the intracutaneous reaction to Brucella organisms or their products. Starr[11] says that the agglutination test, when set up and interpreted by experienced men, is as reliable as any serologic test in use today. Again, the clinician must be on his guard not to misinterpret either a negative or positive report. Most active cases of undulant fever give positive reactions after the second week, but a fairly large number do not. A positive reaction may indicate that the patient had Brucella infection in the past, but is not suffering from it at the time the test is made. It is well known that many people who, in the past, have handled infected animals or infective material may show a positive agglutination titer, and yet never have shown any clinical evidence of Brucella infection.

If the diagnosis is still in doubt after the clinical history has been taken, the blood culture tried, and the agglutination test done, the physician may resort to the skin test. This test is of great value. It is carried out by the same technic as the Mantoux or intradermal tuberculin test and in general has the same relationship to Brucella infection as the Mantoux test does to tuberculous infection. A positive reaction, as shown by a reddened induration, means that the patient is allergic to Brucella organisms. This test is sometimes positive when the agglutination test is negative.

Huddleson and Johnson recommend a fourth laboratory test, the opsonic power of the blood toward Brucella organism, and put great emphasis on its value in combination with the skin test to differentiate past infections from present disease. For some reason this method of diagnosis has not come into very wide use.

The ordinary blood counts and urinalyses do not give much help. There is usually a mild to moderate secondary anemia. The white count usually shows a leukopenia with a relative lymphocytosis. Urine examination does not reveal anything dependable or constant.

All the various members of the Brucella family of organisms can be placed in three groups for practical purposes. These are the melitensis (caprine), the abortus (bovine), and the suis (porcine) varieties, and the above mentioned methods of diagnosis are quite satisfactory. Evans[12] says for all practical purposes the abortus variety of antigen can be used in agglutination tests, but that occasionally so-called para-undulant fever is encountered and additional antigen must be used to help in the diagnosis. A case report will illustrate this.

Mrs. J. S. G., a white widow, aged 71, housewife, was admitted to the hospital on January 5, 1934, for diagnosis because of continued fever, weakness, and pains in the shoulders and lower back. She had been in bed for eleven weeks. Her past history had been uneventful except that she had suffered pain in the back, at intervals, for several years. She drank some raw milk and used cream in her coffee.

She was given a thorough physical examination which was essentially negative except for a kyphos in the dorsal region. The temperature went to 99.6° F. in the afternoons and back to normal during the mornings. The hemoglobin was 78 per cent, the total red count 4,150,000 and the white count 8,100. The blood culture, Wassermann, malaria, Widal and undulant fever tests were negative.

The x-ray showed a non-functioning gallbladder,

ankylosing arthritis of the lower spine, and a spastic colitis.

After leaving the hospital she continued to run a low grade fever and to complain of aches and pains. Night sweats had been troublesome at times and she was very nervous, depressed and apprehensive.

In March, 1934, I first saw her. The above symptoms had not abated. She was still in bed. Her history made me think of undulant fever. Examination was essentially negative except for the spinal deformity and an enlarged spleen. Her blood was sent to a different laboratory from that used in the hospital for an undulant fever test. The report came back negative. This was the second negative undulant fever test in the previous three months from different laboratories. I then gave her the intradermal test for Brucella infection, using myself for a control. Her test was positive and mine was negative. The laboratory then sent to Alice Evans, of the Hygienic Laboratory at Washington, D. C., for paramelitensis antigen. The patient's serum agglutinated this in a dilution of 1 to 1,280. A diagnosis of para-undulant fever was made. She was given *Brucella melitensis* vaccine, prepared by the method of Simpson, with apparently beneficial results. Her fever and pains disappeared after the second week and she has made a slow but definite recovery.

The treatment of undulant fever has not been very satisfactory. At least, no type of treatment supported by statistical data based on large numbers with proper controls has been accepted generally. Until a specific treatment has been accepted, symptomatic measures will be the best we have.

Prophylaxis should be stressed. Investigators are almost unanimous in their opinion that, until the dairy herds and hogs have been freed of the infection, we run a risk in using raw milk and its products. Milk should be pasteurized. Those handling infected animals or infective material should protect themselves against infection. It is hoped that in the near future a vaccine for active acquired immunity may be developed.

Specific treatment with vaccines, sera and chemicals has been tried and each method has enthusiastic supporters. O'Neil[13] has reported the use of both detoxified vaccine and antiserum. He used the vaccine on six patients and the antiserum on three with favorable results.

Huddleson and Johnson have tried a special preparation of the bacteria, called "Brucellin," and have given 12 case reports.

Simpson's[14] work has done much to encourage the vaccine treatment of undulant fever. I have followed his recommendations in the treatment of 12 cases and my reaction is favorable to the treatment.

The use of chemicals intravenously has very little so far to recommend it.

We should keep an attitude of open mindedness and respect towards these pioneers in therapy, for out of their efforts we will soon have something definite and effective.

REFERENCES

1. Cabot, Richard C.: Case Records of Mass. Gen. Hosp. New Eng. Jour. Med., **208**:1317-1320, June 22, 1933.
2. Bruce, David: Notes on the Discovery of a Micrococcus in Malta Fever. Practitioner, **39**:161-170, 1887.
3. Bang, Bernhard: Die Aetiologie des seuchenhaften (infectiosen) Verderfens. Ztschr. t. Tiermed, **1**:241, 1897.
4. Evans, A. C.: Further Studies on Bacterium abortus and Related Bacteria. Jour. Infec. Dis., **22**:580-593, June, 1918.
5. Keefer, C. S.: Report of a Case of Malta Fever Originating in Baltimore. Bull. Johns Hopkins Hosp., **35**:6-14, Jan., 1924.
6. Beattie, C. D.; and Rice, Raymond M.: Undulant Fever Due to Brucella of the Porcine Type, *Brucella suis*. J.A.M.A., **102**:1670-1674, May 19, 1934.
7. Gilbert, Ruth; and Coleman, Marion B.: Undulant Fever in New York State. Jour. Infect. Dis., **54**:305-312, May-June, 1934.
8. Evans, Alice C.: Chronic Brucellosis. J.A.M.A., **103**:665-667, Sept. 1, 1934.
9. Hartley, G. A.; Millice, G. S.; and Jordan, Paul H.: Undulant Fever, Meningitis: Report of Case with Recovery. J.A.M.A., **103**:251-253, July 28, 1934.
10. Huddleson, Forest; and Johnson, Howard: Brucellin, a Possible Specific for Undulant Fever in Man. Amer. Jour. Trop. Med., **13**:485-504, Sept., 1933.
11. Starr, L. E.: Undulant Fever: Its Relation to Brucelliasis in Domestic Animals. J.A.M.A., **102**:902-907, March 24, 1934.
12. Evans, Alice C.: Laboratory Procedures for the Diagnosis of Undulant Fever. Jour. Amer. Pub. H. Assn., **17**:399-403, 1927.
13. O'Neil, A. E.: Preliminary Note on the Treatment of Undulant Fever in Man with Detoxified Vaccine and with Antiserum. Ohio State Med. Jour., **29**:438-439, July, 1933.
14. Simpson, W. M.: Undulant Fever (Brucelliasis): A Clinico Pathologic Study of Ninety Cases Occurring in and About Dayton, Ohio. Ann. Int. Med., **4**:239-259, 1930.

CHRONIC ULCERATIVE COLITIS*

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The first step forward in the development of modern medicine after the long and unproductive period dominated by Hippocrates and Galen, was initiated by Vesalius in postmortems. It was in the postmortem room that chronic ulcerative colitis was found to be a distinct pathological entity and it was first identified by Wilks[1] in Guy's Hospital. Its identification was made the year I was born.

Clinical medicine as initiated by Sydenham elaborated by the use of the sigmoidoscope and x-ray and then brought to its fruition by the microscope and various staining processes, differentiated a distinct clinical entity from a maze of colon troubles. We had had almshouse diarrheas, army diarrheas, amebic dysentery, dysenteries due to the Shiga and Flexner organisms, also ulcers of the colon complicating uremia,

*Read in Section on Gastroenterology, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

malignancies, tuberculosis, diabetes, mercurial poisonings and general infections. There seems to be a plausible argument that there is a general blood stream infection which has a selective action on the intestinal mucosa and underlying tissues aided and abetted by the local micro-organisms. Achylia gastrica may be a contributing cause; there are pancreatic diarrheas due to insufficient external pancreatic secretions, as well as hyperkinetic colons with a disturbance of nervous control, even ulcerative colitis following concussion.[2]

"Ulcerative colitis may be defined in brief as a diffuse regional or general inflammation of the colon, generally beginning in the sigmoidal area, liable to ulceration, anatomically identical with bacillary dysentery, of uncertain etiology and fortunately not contagious or infectious."[3]

Thomas Brown[4] says it is easier to tell what it is not than what it is, and that it is an involvement of the large intestine of unknown etiology. It runs an undulating course with exacerbations and remissions, ulcerating in one attack and possibly with no signs of ulceration in the next. Hern[3] says the relationship of ulcer to the diagnosis of the disease is neither more nor less fundamental or distinctive than that of cavities in the lung to tuberculosis. The numerous grounds for its bacteriological etiology, as presented by many research workers, also show that an unanimity of opinion has not been reached. The progressive pathology, however, must be most easily explained by these bacteriological invasions. Buie and Bargen say:

"Its characteristics always gave us the impression that it was a disorder of systemic origin and in recent years this has become more apparent. Almost invariably either in the history or in our search for foci we found a clue as to the inception of the disease."

The teeth and tonsils are frequently incriminated. It is true, however, that unless it is at the sphincter ani[5] ulceration may occur in the intestine and heal without any evidence of scar tissue left; but the submucosa and different layers are often involved in this fibrotic change even though sigmoidoscopic evidence is absent at the time. A most remarkable feature which we have noticed is that the diarrhea may subside and even the patient will not be intestine conscious, but the pathology does not change.

The factors of immunity and predisposition to these troubles also are difficult to evaluate, yet play a big part in the prognosis and course of the malady. These patients are predisposed in some way by heredity, early training, general physical or nervous make-up to colon afflictions.

The psychogenic or neurogenic background plays a significant etiological and prognostic role, whether as to the cause or result, but when once colitis is established these emotional disturbances have a profound effect on the course of the disease. Murray[6] says:

"The outstanding trait in colitis patients besides fearfulness is their emotional immaturity and in this respect they differ from the gastric ulcer individuals who give the impression of a greater emotional development. It goes without saying that diarrhea is an infantile response to fear. The organization of the infant is presumably such that fear is often expressed by excitation of the colon and this pattern may be laid down and not outgrown."

Many consider the ameba to be the cause and explanation, and many times the maltreated case of amebic dysentery ends in an ulcerative colitis. The bizarre symptoms of amebic infection and the general but unjustified confidence in emetine therapy with the corresponding pathologic advancement justifies such a belief.

"In the submucosa the amebas spread out in all directions between the connective tissue fibers. Their toxin causes edema, fibrin formation and degeneration of cells and intercellular fibers. The submucosa often becomes several times its normal thickness. There is little or no cellular response on the part of the host, so that few polymorphonuclear leukocytes and only moderate numbers of mononuclear cells may be found in the lesions; but when bacteria gain access to the tissues, especially gram-positive cocci, there is a marked polymorphonuclear response and the degenerating submucosal lesion takes on the appearance of a pyogenic abscess with few amebas in it."[7]

We shall dismiss the *Trichomonas intestinalis* as being a saprophytic rather than pathogenic organism, but it is many times present.

Those clinging to the idea of intestinal infection are divided into two groups: (1) those who believe the disease to be a specific bacillary dysentery, the toxins of which act locally on the large intestine and produce ulcerations, which Mackie explained in his paper before the joint section on medicine and gastroenterology in Richmond last year; (2) those who believe that the Bargen's diplostreptococcus is the specific cause. Buie[8] claims the organisms isolated from periapical abscesses of 148 patients caused colon lesions in 75 per cent of experimental animals which received intravenous injections. The organisms were isolated from the tonsils of 100 patients and typical lesions appeared low on the colons of 75 per cent of the rabbits injected.

Our personal belief is that no one organism can explain all cases. Although we have iso-

lated the diplostreptococcus in many cases of chronic dysentery, yet we have felt that they might have been carried down from the small intestine where they normally belong. The lack of agglutination by Bargen's serum many times and the uncertain therapeutic results from the serum and vaccines do not increase our confidence in its specificity. It has been noted by Larson[9] that

"Infections of the upper respiratory tract, namely, influenza, head colds, sore throats, seemed to be main offenders in opening a portal of entry for the organism responsible for the colitis, and we have found these causes have activated some of our quiescent cases."

Larson even noted that removal of foci of infection would cause a flare-up in the colitis, but advised that it should not deter one from removing foci in selected cases.

Trauma must also be taken as an exciting cause because of the physiological function of the colon, which absorbs the moisture from the chyme as it passes downward. The intestinal contents are more consistent when they reach the sigmoid, and in that reservoir they have more chance to injure the mucous membrane and give the invading organisms an occasion to do their damage. The much extolled bran diet must be incriminated as a potent predisposing factor.

The clinical fact remains that ulceration nearly always starts in the sigmoid or rectal region and proceeds proximally towards the cecum, ordinarily not passing the ileocecal valve. Genetically, anatomically and functionally, the colon may be regarded as two organs. The right half coming from the midgut is of common origin with the absorbent ileum and is primarily an absorptive organ. It contains more lymphatics, its walls are thinner, its contents more fluid and its movements more churning and antiperistaltic. The left half, derived from the hindgut, is thicker walled with more mucus protecting it from a more solid content. Its function is more propulsive and for storage. It contains very few lymphatics. The carnivorous animal has a short left gut with little function other than storage, while the herbivorous animal has a long gut exercising a digestive as well as a storage function. In ommivorous man, these functions are combined.

Larimore, McGarrison and Cramer observed injury to the intestinal mucosa and atrophy of lymphoid tissue resulting from vitamin deficiency, which possibly caused a weakness or lessened resistance to the trauma with subsequent bacterial invasion.

Whether diet is a predisposing causative factor is not entirely certain, but the neglect of dietary measures in therapy results in a downward progress of the case.

The generous administration of fruit juices, brewer's yeast, viosterol and a well balanced diet give therapeutic results which present a very plausible argument in favor of this etiology. Again the similarity in symptoms found in pellagra, sprue, xerophthalmia, beriberi and other deficiency diseases would help to support this contention.

In pernicious anemia, even with a diet with a sufficiency of the necessary elements, there is an inability to metabolize and store them. There may be an absence of some defense mechanism which prevents infection of the intestine by the normal inhabitants of the bowel. In ulcerative colitis, there is no absence of hydrochloric acid or enzymes in the stomach, there is no excess of fat in the stools, the meat fibers are digested when time is given for them to be acted upon. After ileostomy or even appendicostomy improvement is noted.

Ulcerative colitis is a disease of adult life occurring in all of my 15 cases between the fifteenth and fiftieth year. Unlike most statistics, 12 of my cases were in the female and three in the male.

The disease has stricken these individuals just in the prime of life and earning power, and has been as merciless in wrecking them as has tuberculosis or heart disease. It has been more of an economic or social problem than either of the above, but fortunately its incidence is not so great. With the increasing incidence and recognition as betrayed by the recent voluminous literature, it may eventually rank in numbers with these diseases. Chronic ulcerative colitis as a cause of death was listed in the Bellevue Hospital Nomenclature published and revised in 1911, and since that time it has been classified as a legitimate cause of death.

Its complications are many times fatal. Many parenteral abscesses, peritonitis from perforation, rectal abscesses, arthritides, purulent skin troubles, heart and general infections have their beginning in ulcerative colitis.

The protean symptomatology must also be considered. There may be a sudden onset with frequent stools, bloody, with pus and mucus, rapid heart action and a varying amount of fever. The stools[10] contain polymorphonuclear cells in contradistinction to the mononuclear cells in amebiasis where there is little cellular

response to invasion unless there is a bacterial accompaniment. In ulcerative colitis or tuberculous colitis there is more pus than blood, while the reverse is true in amebic colitis.

Constipation may be the precursory symptom and then again may alternate with or end the dysenteric stage. The bowel movements may not be abnormal (this is especially true in those ulcerations accompanying uremia) and the condition is detected only by the use of the sigmoidoscope and the barium enema showing the typical lead pipe colon.

Loss of weight, anemia and dehydration are dependent upon the severity of diarrhea, blood, and serum lost.

The portion and extent of the colon involved determines the character of the symptoms. The higher up the trouble extends, as up to the cecum, involving possibly the upper two-thirds of the colon, the more frequent and violent the stools, with colicky pains preceding movement. When the toxemia, anemia and constitutional symptoms are great, this is due to the ready absorption of toxic substances and the tendency to greater blood loss afforded by the cecum. In distal involvement there are fewer stools as a rule, but more tenesmus and a spasm may be so great as to cause actual constipation. The tenesmus may be very marked and cause great pain, while the urgency is annoying, because the sufferer is unable to go very far from the comfort station. The loss of the normal haustrations of the colon and ultimately the involvement of the submucosal and muscular layer make it an inflexible, shortened, less mobile organ. This is not always parallel to the extent of the ulceration, for these changes may occur with only a granular friable mucous membrane. The gut may even become very brittle so as to perforate easily and even the appendix may break off if handled roughly. Hern[11] reports two cases in which appendectomy was attempted, but effectively frustrated by the organ's breaking off in the surgeon's hands.

The effect on the colon as a whole of diffuse fibrosis of the submucosa, even with an intact muscular coat, is contraction. Never is there a dilatation. Therefore the usefulness of the sigmoidoscope as an instrument of diagnosis is more in the early stages. The palpating hand of the clinician feeling a thickened colon is important.

When there are various degrees of ulceration with undermined edges or most of the mucous membrane gone, polyps may develop on the islands of mucous membrane left. The sigmoidoscope is indispensable in diagnosis and Buie and Bargen claim that it shows a definitely progressive picture, with a general edema of the mucosa in the early stages, followed later by miliary abscesses and then ulcers and finally by pock-like scars. Polyps may form later and even malignant degeneration may develop as a final picture. The ulcers may become so deep and tissues so friable that perforation will cause the final exitus with a peritonitis.

Parenteral abscesses about the pelvic colon and rectum due to the migration of the flora through their walls may divert attention from the original picture. Perirectal abscesses are very common and distressing conditions. Contraction, never dilatation, is of a progressive nature, and long before many complications have occurred the barium enema shows a loss of haustrations and shortening of the tube, with contraction of the lumen. This remains constant even when a subsidence of clinical symptoms occurs. A case observed over a period will show the consistent progress of the pathologic condition.

Not all cases have a progressive downward course, but the remission of symptoms often turns one's exultations to grief by a Parthian shot of recrudescence. Thus the prognosis must always be guarded and the victim must live a temperate emotional and dietetic life. Upper respiratory infections should be prevented if possible. I have seen several cases flare up after episodes of this kind.

The differential diagnosis demands the most meticulous anamnesis with a well rounded clinical survey of the patient, the aid of bacteriologist, protozoologist, proctologist and x-ray. It should be remembered that a diagnosis by exclusion is to be made. As a public health problem the disease is not to be considered, since fortunately two cases are practically never seen in the same family and contacts do not develop the trouble.

There is no specific therapy for ulcerative colitis, but medical treatment of these cases is to be tried thoroughly before surgery is advised. First, the case of amebic infection should be diagnosed and quickly and adequately treated, because these cases frequently merge into chronicity with an obstinancy to management. Emetine, when too long administered, seems to aggravate the inflamed mucous membrane, to say nothing of the toxic effect on the heart muscle and other tissue. Craig[12] says emetine is of comparatively little value in curing ame-

biasis, although it is most efficient in curing symptoms.

When a Shiga or Flexner bacillary infection is causative, the specific antiserum should be used if available, because these infections produce similar pathologic conditions which likewise may become chronic. Shiga's infection is rare in this country, but Flexner's bacillus is still considered causative in many cases of this type.

Pneumococcus serum is advocated and used by some, supposedly because of the similarity of the pneumococcus and the diplostreptococcus found in the stools. I have not used this serum, hence cannot testify as to its efficacy.

Bargen's serum and vaccines have many staunch friends and their claims should not be discredited. These biologicals can be obtained from some of our commercial laboratories.

We have used them in both hospital and private practice and have carried out the treatment that Bargen recommended. Some few cases have responded to the treatment, but not in numbers that would make us enthusiastic about it.

Our laboratories make autogenous vaccines and serum from swabs from the rectal ulcers. The patient's serum does not always agglutinate the diplostreptococci, but there are so many strains that perhaps we do not isolate the right one. I feel that this treatment should be given a fair trial, as it holds out a bope of cure in some cases of this very stubborn malady. Months of treatment should be carried out with intervals of rest. Brown and Garvin[13] claim:

"The vaccine should be given for about four months, followed by a rest period of two to four months, and then followed by another course of vaccine, then continued in this fashion for about three years. * * * During an acute phase the serum is often more effective in controlling the disease, but the vaccine, preferably autogenous, is the sheet anchor. Not infrequently the severity of the colitis is actually increased by an overdose of vaccine or serum."

Buie[14] claims that since the institution of his treatment the cases demanding surgical relief have diminished remarkably. In 1932 they had 110 cases of chronic ulcerative colitis and only one ileostomy, and patients are not dying as before.

In medication, the one most used drug is opium in some of its forms. Other drugs come and go, but opium goes on forever, for relief of pain or checking the bowel movements. Paregoric is used in milder cases, tincture of opium to morphine where the pain is a big factor. Caution should be employed in using opium in chronic cases, because of its habit-forming possibilities. Bismuth subcarbonate or subnitrate is used in conjunction with opiates, but more through force of habit than from any known effect except in the mild cases. Bismuth subnitrate has been used in large doses and many cannot tolerate it without cyanosis and methemoglobinemia, but Roe[15] claims methemoglobinemia is likely to occur in patients who have intestinal putrefaction, so nitrate poisoning and the above symptoms appear to be dependent on the presence of certain putrefactive bacteria in the intestine. This is especially noted when bismuth subnitrate is given by rectal injections; hence the caution in these cases. Bismuth subcarbonate is not open to these hazards.

Rest in bed during the active processes is too trite to mention. Rest from mental irritations is quite as essential. Topical applications to the ulcerated areas and bowel irrigations are mentioned only to condemn them. More gastroenterologists are agreed as to the efficacy of tincture of iodine orally administered than as to any one drug. Whether this is due to the antiseptic effect on the lumen of the bowel or the alterative effect upon the body as a whole I am unable to say.

The diet in these cases should be varied according to the stage and the gravity of the symptoms. The management of patients with high fever, bloody and frequent stools should vary from that of the subacute stage. Milk boiled and possibly thickened or predigested with zwiebach, lactose, beef juice and other non-irritating foods should be supplemented later with high protein (80 to 100 grams) and high caloric non-residue diets so that the serum protein of the blood and hemoglobin will maintain a normal ratio. Heliotherapy is advised whenever climatic and weather conditions are favorable.

Vitamins should especially be given ample consideration in the diet. Brewer's yeast has shown its worth in many cases, and the good effect on many of the complications as well as the alterative effect on the system as a whole make it a standby in our therapeutics. Intravenous glucose and normal salt are particularly helpful in acute conditions, bridging over these dehydrated and starved cases. They should be used early and often. Blood transfusions are particularly helpful both in acute cases in relieving the anemia and preparatory to surgery.

I have seen most happy aftermaths of a transfusion, so when donors are available blood should be used prodigally. Citrus fruits, tomato juice, cod liver oil, viosterol, pureed vegetables such as the pediatricians give their patients, help in making the balanced diet which is necessary to keep the greatest resistance to further involvement of the tissues. Calcium is given either as a medicine or in the diet, because it is eliminated freely by the bowel. Iron is used to combat the secondary or microcytic anemia. This anemia, however, does not assume a very profound type. A high protein diet is prescribed to replace the loss of hemoglobin and body protein, since failure either to metabolize or to consume protein, and consequent edema, are known sequels of the disease. These sequels are particularly observed in conditions involving the stomach and upper intestinal tract.

As to surgical treatment, an appendicostomy or cecostomy should first be tried for the irrigation of the colon with weak iodine and tannic acid solutions. I have seen a patient whose weight rose from 80 to 120 pounds after an appendicostomy. This surgical procedure does not seem to meet general approbation, but my observation of its merit causes me to have confidence in it. The hazard of an appendicostomy is very slight, and I feel that it should precede a more mutilating operation such as an ileostomy, which may later be necessary. Ileostomy is especially indicated when rectal or other parenteral abscesses, stenosis of the colon and intractable diarrhea are encountered. This bold procedure quite often gives brilliant end results. If the colon still suppurates and gives trouble, it may have to be taken out.

BIBLIOGRAPHY

1. Wilks: Guy's Hospital Report, **84**:14, Fourth Series, No. 1, Jan., 1934.
2. Lancet, p. 1781, 1904.
3. Hern: Ulcerative Colitis. Guy's Hospital Reports, **81**:325, 1931.
4. Brown, Thomas: International Surgical Digest, **8**:67, Aug., 1929.
5. Brown, T. R.; and Paulson, M.: Internationals Digest, **8**:67, Aug., 1920.
6. Murray: Ulcerative Colitis and Bloody Diarrhea. Amer. Jour. Med. Sci., **180**:247, 1930.
7. Meleney, H. E.: Pathology of Amebiasis. J.A.M.A., **103**: 1213, Oct. 20, 1934.
8. Buie: J.A.M.A., p. 1466, Nov. 4, 1933.
9. Larson: Proc. Mayo Clinic, p. 243, April 22, 1931.
10. Magath: Amebiasis. J.A.M.A., **103**:1219, No. 16, Oct. 20, 1934.
11. Hern: Ulcerative Colitis. Guy's Hospital Reports, **81**:329, 1931.
12. Craig: Symptoms, Diagnosis and Treatment of Amebic Carriers. J.A.M.A., **90**:1345, April 28, 1928.
13. Brown and Garvin: Medical Clinics of North America, p. 536, Sept., 1934.
14. Buie: J.A.M.A., p. 1466, Nov. 4, 1933.
15. Roe, Harold E.: J.A.M.A., **101**:352, July 29, 1933.

DISCUSSION (*Abstract*)

Dr. Horace Reed, Oklahoma City, Okla.—It is very evident from the essayist's paper that we have not yet arrived at a definite cause or definite treatment of chronic ulcerative colitis. When there is a better understanding of the etiological factors, there no doubt will be a very much lessened incidence of chronic colitis, since this knowledge may furnish the proper clue for prevention. We can all agree in so far as treatment of the causes is understood that it is altogether medical.

In the less severe types of chronic ulcerative colitis, medical management should at least be given a trial whatever the cause, or causes, may be. Chronic ulcerative colitis, once fully developed, must be considered as an entity. We have a large structure with an important function which is chronically inflamed. It is being constantly irritated by the products of its own involvement as well as from the contents of the intestinal tube pouring into it from above.

Dr. Riely referred to pulmonary tuberculosis for the purpose of comparison. Most of us can remember, only a few years ago, when the thought of surgery for pulmonary tuberculosis never entered our minds, and yet the very fundamentals of surgery were indicated all the time. Long ago Hilton discussed rest in its relation to treatment of disease. All of us were taught that whatever else was indicated, physiological rest was always indicated in any inflammatory process. Some of us need to be reinoculated with the fundamentals of the principles of surgical treatment.

A chronic inflammatory bowel to be kept at rest should be emptied of the material which keeps up the constant irritation. Irrigation of the bowel from below cannot be done successfully without considerable distress, and even danger to the patient. It can be done through an appendicostomy or a cecostomy. These operations are relatively free from danger, may usually be done under local anesthesia, and should the progress of the patient be such that irrigations, or treatments, through the opening would no longer be necessary, the opening may be easily closed. I happen to know that Dr. Riely has, for many years, been making a study of this distressing disease, and that he has often plead with the surgeons to come to his assistance in doing an appendicostomy or a cecostomy. As in tuberculosis, it looks as though the internist must again show the surgeon the way.

When the bowel has been irreparably damaged and is incapable of restoration to normal function, then an ileostomy would be the only thing left to do. In 1932 Brown, Bargen and Rankin reported observations and results of ileostomy in 82 cases. The results, as a whole, seemed to make it undoubtedly worth while. When indications exist, there cannot be any division of opinion as to the usefulness of this operation.

Dr. Charles T. Stone, Galveston, Tex.—Dr. Riely has treated the subject of chronic ulcerative colitis in a very thorough and conservative manner. One has only to go over a small part of the literature on this subject to realize that there is almost no semblance of agreement about it. In the first place, there are those who consider that it is yet to be proven that it is a disease entity and not a symptom complex. It appears that we are justified in accepting this as a distinct and separate disease, and that it is not any other type of

inflammatory affection of the colon in bizarre form. Now and then cases of supposed chronic ulcerative colitis are reported to have been relieved by emetin, but in such instances the disease was due to amebiasis and not to chronic ulcerative colitis. In fact, any colitis that is relieved by an anti-amebicidal remedy can by that token alone be dismissed as one of chronic ulcerative colitis.

In the second place, the chief battleground in this condition is connected with the question of its etiology. Bargen and his associates have done a very fine piece of investigation in their studies at Rochester, Minnesota. The non-hemolytic diplostreptococcus of this investigator is beyond any doubt more uniformly recovered in cultures taken from the ulcer bases than is any other organism. In our clinic at Galveston it is quite the exception when we are unable to grow Bargen's organism from the material removed from the ulcers through the proctoscope. So constantly is this organism found in cases that are clinically chronic ulcerative colitis that the failure to recover it in a given case casts considerable doubt upon the accuracy of the diagnosis. Then, too, it has been repeatedly shown that the intravenous injection of suspensions of this organism in rabbits causes a rapidly developing, severe colitis in all respects similar to that seen in human cases. Furthermore, a large experience has shown that a considerable number of cases are relieved or greatly improved by the use of vaccines and sera prepared from the diplostreptococcus. On the whole, it appears that Bargen has developed a very strong case for his organism as the bacterial agent in chronic ulcerative colitis. Just why his work should have been attacked so vigorously in some sections has never been clear to me, because when the results of his studies are compared with those of others his case looks stronger than ever before. It requires some athletic maneuvers on the part of one's credulity to believe it is a mere coincidence that a constant organism can be cultivated from the colon in practically all cases, that this organism reproduces the disease when injected into animals, and that vaccines and sera prepared from it bring about improvement in clinical cases. Perhaps Bargen's coccus does not fulfill all of Koch's postulates, but it approaches their fulfillment more closely than does any other proposed etiologic agent.

In the third place, there is a growing conviction that chronic ulcerative colitis is a systemic disease with particular localization in the colon. The association of chronic infectious arthritis in some cases lends support to this view. Many concomitant factors seem to stand in the role of contributory causes. Among them it is reasonable to believe that states of disordered colon function may predispose to it through interference with the circulation in the mucosa and submucosa. In certain instances pregnancy in some wholly unknown manner seems to favor its onset. I have seen one case in which two successive pregnancies were complicated by this type of colitis of unusual severity. Recovery followed spontaneous abortion and the patient has remained well.

Finally, in the matter of treatment so little is definitely known that one cannot make statements that are dogmatic. It is felt that autogenous vaccines or stock vaccines if the former cannot be had should be given a trial. The mainstays in therapy are the high calory, high vitamin, low residue diet, rest and opium, together with any symptomatic measures that seem indicated. Colonic irrigation with any of the solutions proposed is apparently worse than useless. Some patients recover, others resist all treatment, the majority have alternating periods of remission and relapse. Until better methods of treatment based on a more thorough understanding of the entire condition are available, we should continue investigations of the disease in the hope that a full solution of the many problems involved may be reached. Meanwhile it behooves us to be rational.

A NEW TREATMENT FOR RECALCITRANT PUSTULAR ACNE*

PRELIMINARY REPORT

By ANTON W. SOHRWEIDE, M.D.,
New York, New York

The perusal of case records in any dermatological practice will reveal that the accepted treatment of acne vulgaris is productive of results gratifying to both patient and physician, regardless of what method is pursued, if treatment is conscientious and extended over a sufficient time.

Further study of such records will show a small percentage of acne patients, perhaps roughly 2 per cent, who do not respond in any satisfactory measure to the most modern treatment regardless of how carefully it is given and faithfully persisted in. This small group of patients form a peculiar problem for the dermatologist because they are usually young people in their impressionable years standing on the threshold of life with a feeling of hopelessness in their condition and subsequent thereto a decided inferiority complex that in some instances may thwart an otherwise well-rounded life, because of the unsightly appearance of their face and other involved areas. Many, too, lacking the encouragement of their physician (who has tried every regime without success) sink into abject misery and overwhelming hopelessness. Such patients present a psychological as well as a dermatological problem.

There is no question that our therapeutic armamentarium needs strengthening and additional research to relieve these young sufferers from pustular acne.

I wish to present here a preliminary survey of a simple method that I found helpful in checking a large percentage of patients suffering, despite good treatment, from the ravages of this

*Received for publication August 6, 1934.

disfiguring disease. The method to be outlined here, though unreported, is not new nor is it untried. It was suggested to me in part by Dr. Elwell of Madison, Wisconsin, after he had been using it with splendid success on certain cases of resistant pustular acne associated at times with a moderate degree of cachexia.

Several patients interviewed at that time were so enthusiastic about results that it was felt further study of a large number of cases might prove instructive.[1]

As a working background the series of papers by Dr. Osborne and his associates on "The Effect of Arsenic on Rabbits," the last of which appeared in the *Archives of Dermatology and Syphilology* (vol. 25, pp. 419-437, March, 1932) were used because in them the most recent and thorough account of the chemical effect of arsenic on the skin is obtained. I shall leave to a later time a discussion of the chemical action of neoarsphenamine and the histopathological findings; suffice it to say that in modern therapy the influence of neoarsphenamine on pyogenic processes has been recognized and the value of neoarsphenamine in cachexia is well known. In addition arsenic has been used for its non-specific effect in such conditions as tuberculosis.

The patients reported here were selected cases from among those who had been hitherto resistant to various accepted treatment at a large skin clinic and whose acne had its basis on a pustular background. This treatment as outlined here was instituted one year ago so that at the termination of a year's time we are enabled to secure a fair idea of the effect and permanence of the therapy.

1. The Stuyvesant Square Hospital, Skin Clinic, New York City.

METHOD OF TREATMENT

As shown in the chart below patients selected were those who had proven resistant to the usual acne treatment and presented a pustular acne associated with a degree of cachexia. The high percentage of female patients is due to the fact that at the time this work was done I was treating only female patients, so that only that sex came under my personal observation.

The patients were given an initial dose of neoarsphenamine 0.2 gram, depending on their general appearance, the smaller and less vigorous receiving the smaller dosage. If there was no untoward reaction this initial dosage was increased to 0.3 or 0.35 gram, given once weekly for four doses. A rest period of two weeks was then given and if no papules or pustules developed during that time, the treatment was not continued; where the acne was not entirely checked the greater dosage was repeated for another four injections, using the larger dose. At no time were more than six injections given be-

SUMMARY OF RESULTS IN FORTY CASES OF RECALCITRANT PUSTULAR ACNE

Total Treated	Average Sex and Age	Location	Average Duration	Previous Treatment	Dosage	Results	Comment
14	15-20 years, all females	Face, back and chest	2½ years	3 had 16 ¼ S. U. x-ray 1 had no treatment All had lotions 7 had Alpine lights 3 had ovarian therapy	5 injections of neoarsph.; 0.3 gm. at 5-7 day intervals	Average improvement 80-90 per cent after one year	Lesions began to clear after third injection
18	21-30 years, all females	As above	6 years	6 had 16 ¼ S. U. x-ray 2 had no treatment 10 had 12 or more Alpine lights All had drying lotions 4 had course of ovarian injections	As above	Average improvement 75-85 per cent after one year	As above
5	30-40 years, all females	As above	2 years	All used drying lotions for years 3 had x-ray S. U. ¼ for 16 treatments Ovarian injections with effect in 3 cases	As above	Average was 85 per cent improved after fifth injection	
3	17-20 years, all females	As above	2 years	Usual treatment with lotions, Alpine light and glandular therapy	As above	No improvement	

(Brief summary showing results of treatment. The group ages 21-30 appear most chronic and resistant to treatment. Improvement involves disappearance of pustules and papules. In all cases where improvement followed this was seen after the third injection.)

cause of the satisfactory response to the lesser number. Regarding the continuance of further treatment where no response was elicited in either six or eight injections, it is felt that it is unwise to give more than eight if the latter number is not productive of some effect. Further investigation relative to this problem of unresponsive cases will be considered in a later paper.

Reviewing the results thus far obtained it is no exaggeration to say that they are completely satisfactory. Of the seventeen cases first recorded, fourteen completed the minimum number of injections, which is four, and thirteen definitely improved. Two patients did not respond despite the fact that one received six, the other four, injections. Three patients received less than four injections; one receiving two injections was slightly improved. The addition of other patients, bringing the total number to forty, was productive of further pertinent data. In this latter group of 23, three cases failed to respond to the prescribed therapy. All other cases, however, improved 75 to 90 per cent after injections as outlined.

SUMMARY

Treating empirically forty cases of pustular acne recalcitrant to the best therapy, excellent results are recorded with the use of tonic doses of neoarsphenamine in thirty-seven cases varying in ages from 15 to 40.

Further study is necessary to determine the actual process bringing about the desired result; the possibility is offered that it probably lies in a systemic shock much like that in protein therapy.

This method of arsenotherapy is not advanced as a panacea in acne treatment, but is presented as an addendum to present therapy that may prove helpful in those occasional cases where the disease is apparently resistant to all other treatment. It should remain in the armamentarium as a method of last resort.

CONCLUSIONS

(1) Forty cases of stubborn acne are presented, thirty-seven of which satisfactorily responded to modified arsenotherapy given in a new way.

(2) The method is suggested as one to be employed only as a last resort.

(3) The paper is presented as a preliminary report.

THE NEWER MANAGEMENT OF THE DIPHTHERIA CARRIER*

By IRVING S. BARKSDALE, M.D., F.A.P.H.A.,
N. ETHEL TURNER, R.N.,
and
R. LOEE BATES, R.N.,
Greenville, South Carolina

The incidence of diphtheria carriers following diphtheritic infections of the upper air passages, is quite uncommon, but when the organisms are found subsequently on taking cultures from the nose and throat for release of the patients from isolation, everyone concerned on the case experiences much trouble and inconvenience, especially the health officer, who is severely criticized most frequently by the mother of the patient. She cannot or will not understand why her child cannot be released from isolation after the symptoms of the illness have disappeared. In self-defense the public health and clinical laboratories have devised ingenious, but complicated virulence tests, which may be very helpful when negative, yet there is no assurance that the organisms which persist may not resume their virulence some time after the child has been allowed to reattend school, thereby causing other cases of diphtheria.

The problem of the diphtheria carrier has, for many years, greatly perplexed medical science, and about all that has been accomplished of any consequence is the virulence test, which is a modest admission of failure expressed in a few words:

"We cannot rid the carrier of his organisms, and for this reason let us prove to our own satisfaction that the organisms are avirulent."

Other investigators, being uneasy about the presence of the Klebs-Loeffler bacilli in the nose or throat, most often the throat of the carrier, have been endeavoring to find some chemical or biological agent that will destroy these organisms. Various antiseptics and germicides have been applied locally to the surface of the tonsils, into their crypts as deeply as possible, also to the nasopharyngeal mucous membrane, without satisfactory results. Diphtheria antitoxin has also been used locally, and additional subcutaneous or intramuscular injections have been given without much apparent success. In

*Read in Section on Public Health, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

*From the City Health Department.

spite of everything and every effort, the Klebs organisms have persisted.

Until 1927 diphtheria was too prevalent in our city, but fortunately the great majority of cases became bacillus-free of themselves in a short while. For many months what few carriers we found were treated with a miscellaneous assortment of drugs and solutions. After this treatment, in combination with watchful waiting for a number of weeks, the carriers were at length found to be bacillus-free, perhaps from treatment and due, no doubt, to the active immunity then possessed by the body.

At the close of the year 1925 a very effective germicide was finally developed in our laboratory after four years of research, by titrating a weak solution of bismuth and ammonium citrate or lactate with a solution of crystal violet (hexamethyltriamintriphenylcarbinol chloride) to form a loose combination of this triphenylmethane dye with this heavy metal which resulted in the stepping up of the gram-positive killing power of the dye-metal combination one thousandfold. One part of bismuth lactate is allowed to react with 10 parts of crystal violet at room temperature. Gram-positive organisms will not grow in one to one billion dilutions of the resulting bismuth dye compound, whereas they will grow in dilutions of one to one million of crystal violet. Its effect upon the commonest pathogenic micro-organisms is shown as follows:

Inasmuch as these laboratory findings were borne out by the successful, rather widespread clinical use of the dye in the treatment of acute and chronic infections, it was decided to observe the effect of its frequent application to the mucous membrane of the nose and throat of diphtheria carriers.

There were 28 cases in our series and all of them harbored the Klebs organisms in the throat. Most of them were children of pre-school and school ages. Realizing the difficulty of reaching the organisms which happened to be lodged at the bottom of the tonsillar crypts, it has been our practice to saturate the cotton on the end of a wooden applicator and massage the dye into the tonsil as much as possible, and to leave with the mothers a small vial of the bismuth-triphenyl methane dye solution (0.4 per cent), along with a few cotton-tipped applicators with instructions to swab the throat twice daily. On the following day cultures are taken, incubated and examined, after which another swabbing and massage is given. Usually, on the second day the number of Klebs organisms is markedly diminished and they have entirely disappeared after two or three days of this intensive treatment. The efficacy of the dye is no doubt due to its ability to kill bacteria in very high dilutions. By applying the standard stock solution, which is 0.4 per cent in 10 per cent glycerin-aqueous

Table 1

DILUTION

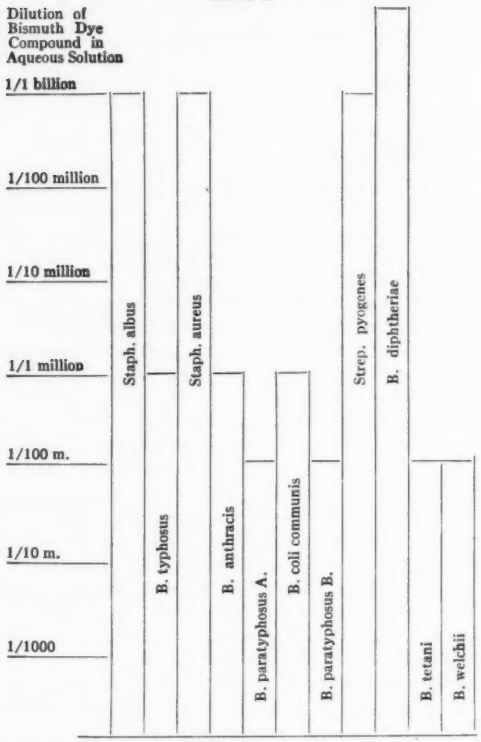
TIME OF INCUBATION, 48-72 HOURS

Organism	1:1 000	1:10,000	1:100,000	1:one million	1:ten million	1:100 million and 1:one billion	1:ten billion
Staph. alb., aur. and cit.	No growth	No growth	No growth	No growth	No growth	No growth	Growth
B. typhosus	No growth	No growth	No growth	No growth	Growth	Growth	Growth
B. anthracis	No growth	No growth	No growth	No growth	Growth	Growth	Growth
B. paratyphosus A	No growth	No growth	No growth	Growth	Growth	Growth	Growth
B. paratyphosus B	No growth	No growth	No growth	Growth	Growth	Growth	Growth
B. coli communis	No growth	No growth	No growth	No growth	Growth	Growth	Growth
Streptococcus pyogenes	No growth	No growth	No growth	No growth	No growth	No growth	Growth
B. diphtheriae	No growth	No growth	No growth	No growth	No growth	No growth	No growth
B. tetani	No growth	No growth	No growth	Growth	Growth	Growth	Growth
B. welchii	No growth	No growth	No growth	Growth	Growth	Growth	Growth
B. pyocyaneus	Growth	Growth	Growth	Growth	Growth	Growth	Growth

Showing the effect of dilutions of the bismuth dye compound from 1:1,000 to 1:10,000,000,000 on *Staphylococcus albus, aureus* and *citreus, B. Typhosus, B. anthracis, B. paratyphosus A* and *B, B. coli communis, Streptococcus pyogenes, B. diphtheriae, B. tetani, B. welchii,* and *B. pyocyaneus.*

NOTE.—*B. diphtheriae* is killed by a 1:1,000 solution of the bismuth dye in 15 seconds. *Staphylococcus albus* and *aureus* are killed by a 1:10,000 solution in less than 10 seconds. Other organisms not tested after the method of Reddish.

Table 2



Showing graphically the effect of the antiseptic bismuth dye on eleven important pathogenic organisms.

solution (the purpose of the glycerin being to lower the surface tension, thereby getting better diffusion of the germicide) to the surface and into the openings of the tonsillar crypts as far as possible, it can be readily seen that the most remote organisms in the deepest crypt has carried to it by the moisture in the crypt a sufficient amount of the dye to destroy it. The bismuth dye product may be used copiously, as it is non-toxic and non-irritating.

Although we have not yet had nasal carriers to deal with, we are of the opinion that this can be satisfactorily managed by irrigating the nasal cavity with a 1:1,000 solution of the dye in physiological saline. This strength solution may be made very easily by diluting one part of 0.4 per cent solution with three parts of 1.0 per cent sodium chloride solution.

It has also been our practice to have our own examinations of the stained smears corroborated. Each corroborative examination following this treatment has been negative for the diphtheria organisms.

We have not yet traced a case of diphtheria to these arrested carriers. The few cases we have are always of a scattered, sporadic nature. Subsequent smear examinations made a number of days following the disappearance of the organisms from the throats of the carriers, have proven negative. Usually the children who developed into carriers were those with enlarged, ragged and very cryptic tonsils. A few days following the disappearance of the Klebs organisms, it has been our practice to refer the patients to their family laryngologists or to the clinics for advice and tonsillectomy, fearing lest some of the bacilli may have escaped the killing effect of the dye which would cause them to revert once more to the carrier state.

CONCLUSIONS

(1) The problem of the diphtheria carrier has been mentioned briefly.

(2) The germicidal effect of a comparatively new bismuth dye compound, in respect to the common, pathogenic organisms, has been described.

(3) Our experience, using this dye, in 28 cases of diphtheria carriers, has been described.

(4) Re-examination of smears taken from the arrested cases has proven negative.

(5) No new cases of diphtheria have been traced to these individuals who were found to be carriers and who became arrested by treatment with this new method.

ACKNOWLEDGMENTS

We feel indeed grateful for the assistance rendered us by the physicians of this City, especially to Dr. T. R. W. Wilson, Clinical Pathologist at the Greenville City Hospital, for his corroborative work, and to Dr. Richard M. Pollitzer, Pediatrician, for his valuable assistance in the preparation of this paper.

BIBLIOGRAPHY

1. Wilkinson. Geo. R.; and Barksdale, Irving S.: Effect of Bismuth-Violet on Certain Pathogenic Organisms. Sou. Med. Jour., **21**: No. 11, Nov., 1928.
2. Sanders, J. Levis: The Value of Bismuth-Violet in Otorhinolaryngological Practice. Sou. Med. Jour., **23**:140-142, Feb., 1930.

DISCUSSION (*Abstract*)

Dr. Claud E. Watson, Dallas, Tex.—My experience with the dye has been chiefly with its use in the intravenous treatment of malaria. It has proven to be the most effective treatment I have found. It has low toxicity and no cumulative effect. Over three thousand injections have been made and at no time has there been any evidence of a systemic reaction.

In 1931, a study of the lethal action of this bismuth

dye compound on some of the commoner protozoa was made in my laboratory. Paramecium was killed in 5.5 minutes with 1,200,000 dilution; *Ameba proteus* was killed in 30 seconds with the same dilution and in 5.5 minutes with a dilution of one to twenty million. Blood serum taken from a patient 5 minutes after injection of 100 mg. killed paramecium in 7 minutes and the ameba in 3.5 minutes. Serum taken from the same patient 17 hours later killed paramecium in 15 minutes. Normal serum killed paramecium in 55 minutes.

I have used the same compound in a number of local infections such as staphylococcus, streptococcus and Vincent's infection with very gratifying results. A severe case of non-gonorrheal vaginitis was cleared up almost overnight and ulcerations of various types have responded quickly to the dye.

There has been noted an anesthetic effect which I am unable to explain. Recently I removed a large lipoma from the back of a very nervous woman. Aseptic measures were purposely not strictly adhered to. Before closing, the wound was mopped out thoroughly with the bismuth dye solution. The incision healed perfectly and there was little or no pain after operation.

Recently an experiment was made in my laboratory to determine the relative diffusibility of a fresh aqueous solution and the glycerin-aqueous stock solution, using tragacanth jelly and coagulated egg albumen as colloids. It was found that both solutions were quickly diffused and that the glycerin-aqueous solution was about 20 per cent more rapid in diffusibility. A further exhibition of its powerful penetrating effect is seen in the rapidity with which blood cells, protozoa and microorganisms are stained with the dye. It is a very suitable stain for spirillae.

THE TEACHING OF HYGIENE IN MEDICAL SCHOOLS*

By R. R. SPENCER, M.D.,†
Washington, D. C.

In the last analysis, the sole purpose of all education is that one may achieve a full, abundant, and useful life. From a biological point of view education may be defined as a gradual process of adjustment to our mental, physical, and social environment.

Thus defined, I conceive of education as having three main purposes:

(1) To teach people to think for themselves; in other words, to teach them to make more effective use of the brain as an organ of adjustment and adaptation.

(2) To teach people to control their primitive desires and to face and accept the unpleasant, as well as the pleasant realities of the world we live in; and, finally,

(3) To teach them to take conscious and rational control of their conduct so as to develop habits and patterns of behavior which are socially efficient, and to seek out those forms of self-expression which are in harmony with the good of the whole.

The medical school which does not keep these fundamental objectives of education in mind may turn out learned physicians, but it will not turn out the best physicians. The acquisition of knowledge, *per se*, while most important and useful, cannot be labeled our only desideratum.

It has been said that in most of our medical schools the teaching of personal hygiene has not proven very effective. The subject matter, for some reason, seems not to have made much appeal to medical students in general. Their interest has not been aroused, and hence class attendance has been poor. And yet personal hygiene can be shown to be one of the most important courses in the entire medical curriculum. It really should be the foundation stone upon which all measures in the field of preventive medicine are to be erected. Why, then, has the teaching of it been unsatisfactory? The blame can hardly be placed on the students, nor is the subject necessarily dull and uninteresting. On the contrary, the art and science of healthful living is of deep interest to everyone. A little introspection will tell us that it is safer always to proceed on the assumption that there are no dull subjects, perhaps only dull teachers, and that the students may be depended upon to become interested whenever we teachers can convincingly demonstrate that the medical wares displayed in the class room over our educational counters are going to be of value to them in the practice of medicine. After all, a teacher must make an appeal to the ego of his students in somewhat the same way that a salesman does to prospective customers. One cannot expect students to be interested in any form of knowledge unless, at the same time, they are made to visualize how such knowledge will be made use of and to their own advantage. This utilitarian and pragmatic attitude of students toward learning undoubtedly is a salutary one. And so, to us the fault seems not to be with them. Perhaps we have failed to connect personal health and hygiene with the practice of medicine. We are still primarily treaters of pathology deeply interested in cases of this and that disease and in the life history of the respective parasites and in the pathologic picture they incite, but only mildly interested in the patient's

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*Read in Section on Medical Education, Southern Medical Association, Twenty-Eighth Annual Meeting, San Antonio, Texas, November 13-16, 1934.

†Surgeon, U.S.P.H.S.

keeping his health or in helping him to become an effective member of society.

THE TEACHER MUST LOOK ALWAYS TO THE FUTURE

The medical profession is naturally a conservative group, but intelligence would suggest that we who teach medical students look into the future with the hope of seeing what the public is going to demand of our profession the day after tomorrow. No thoughtful physician can long consider the contemporary scene and the rapid changes taking place in human society without reaching the inevitable conclusion that his profession must soon take on additional duties and responsibilities in the fields of personal and social health. According to Pasteur, it is always the prepared mind that achieves, and consequently we should never let it be said that we have failed to prepare the minds of medical students for the demands that will be made upon them in maintaining that high degree of health defined not simply as a state of freedom from disease, but rather as a dynamic life-process of continuous growth and achievement. We cannot teach what we have not ourselves visualized, namely, that the physicians of the future are going to be actually human engineers and act as guides and counsellors to their patients as well as caring for them when sick.

It is, of course, true that for a very long time the emphasis in medical practice has been shifting slowly from the curative to the preventive side, but in more recent years the tremendous growth and expansion of many welfare agencies (controlled unfortunately not by physicians but by laymen) and the increasing demands of the public for preventive health measures should be sufficient to indicate to us that this trend is now being accelerated at a rapid rate.

THE CHIEF DUTY OF THE INSTRUCTOR IN HYGIENE

One cannot draw a line between curative and preventive medicine, since a case cured means usually several more prevented. Nor can we draw a line between personal hygiene and public hygiene, but surely more and more of us now realize that the individual physician must, as Dr. Donald B. Armstrong has said, "not only cure disease and prevent disease, but create health." Or as Dr. Iago Galdston puts it, "he must engage in the practice of individual preventive medicine." Indeed, "The Health Examiner," a monthly journal published by the New York Academy of Medicine, is exclusively devoted to the practice of individual preventive medicine, and the Academy should be highly commended for its vision and pioneer work.

In addition to what is usually taught in courses in hygiene there is an enormous amount of information now scattered throughout the biological sciences of psychology, sociology, ethics, economics and eugenics which is of inestimable value to the modern practitioner of individual preventive medicine, a term we take to be synonymous with personal hygiene in its broadest sense. Very little, if any, of this information which has a considerable bearing on the health and life of the individual or the health and life of the social group has been sifted out and coordinated and integrated into a form suitable for and easily assimilated by the student of medicine. This we conceive to be the paramount duty of the instructor in personal hygiene at the present time. Some will object, no doubt, that all these fields should be covered in the premedical years. Perhaps so, but the fact remains that the majority of medical students even in schools that have a degree in arts or science as an entrance requirement either do not have this knowledge or else they have received it in a superficial sort of way without visualizing its usefulness or relating it to medical practice. Furthermore, the best time to acquire any information is always just before use is going to be made of it.

The course in hygiene at the George Washington University School of Medicine during the past two years has been patterned largely in compliance with the ideas here expressed. Inasmuch as the course is young, there is admittedly much room for growth and improvement, but the response of the students so far has been encouraging and while some of the lectures have departed considerably in manner of presentation and in content from orthodox procedure, we nevertheless submit herewith a syllabus of the course as it will be given during the coming year. At the same time we express the hope that it will contribute in a positive way toward the more effective teaching of a subject which is steadily growing in importance.

The first three introductory lectures describe the aims and purposes of the course and discuss the biological foundations of health. Subsequently, the lectures are divided into four nearly equal parts, namely:

(1) Hygiene of the mind.

(2) Hygiene of the individual as a unit of society, social hygiene.

(3) Hygiene of the body.

(4) Hygiene of the environment, sanitation.

These divisions are convenient for teaching purposes, but are of course somewhat artificial, since one cannot separate the health of the mind from the health of the body nor either one from the health of the individual as a member of society.

INTRODUCTORY: THREE LECTURES

(1) Outline and general discussion of the course and its aims
(2) The biologic basis of health
(3) Health, heredity and environment.

HYGIENE OF THE MIND: TEN LECTURES

(4) The brain as the organ of adjustment
(5) The scientific method and habit
(6) The scientific method and habit
(7) Contemporary schools of psychology
(8) The role of the intellect in mental health
(9) The role of the emotions in mental health
(10) The role of the emotions in bodily health
(11) The growth and development of the personality
(12) Religion and mental health
(13) Conference and discussions

HYGIENE OF THE INDIVIDUAL AS A UNIT OF SOCIETY: TWELVE LECTURES

(14) The mechanism of social adjustments
(15) Social maladjustments
(16) Medical sociology
(17) Medical economics
(18) Medical ethics and the doctor-patient relationship
(19) The significance of the social habit or herd instinct
(20) Health and sex
(21) Health and marriage
(22) Birth control
(23) The social significance of the healing cults
(24) Health fads and quackery
(25) Conference and discussions

HYGIENE OF THE BODY: TEN LECTURES

(26) Periodic health examinations
(27) Expectancy of life
(28) Alcohol and health
(29) Tobacco and drug addiction
(30) Oral hygiene
(31) Infant, child and school hygiene
(32) Nutrition and health
(33) Nutrition and health
(34) Exercise and health
(35) Conference and discussions

HYGIENE OF THE ENVIRONMENT OF SANITATION: TWELVE LECTURES

(36) Milk supplies and pasteurization
(37) Air and ventilation
(38) Water purification
(39) Water purification
(40) Climate and health
(41) Industrial hygiene
(42) The soil and health
(43) Sewage disposal, city
(44) Sewage disposal, rural
(45) Visit to modern dairy
(46) Visit to modern water-purification plant
(47) Visit to modern sewage-disposal plant

MENTAL HYGIENE

At least two lectures devoted to the scientific method and habit of thought are included under mental hygiene because we are convinced that no student should be turned out of medical school without becoming thoroughly imbued with the efficacy of the scientific method of approach to truth. In fact, there is no other reliable method and the scientific method is by all odds the most effective weapon man has ever devised for uncovering the secrets of nature and bringing the environment under control. We believe that the mere acquisition of medical knowledge is entirely secondary to a thorough conditioning in the scientific discipline. There are far too many practitioners who have a mere speaking acquaintance with a genuine detached, dispassionate, disinterested and objective attitude toward the results of their own therapy or their own experimentation!

The scientific habit of mind should be acquired early and every physician should first be a genuine scientist. While we dislike rigid definitions nevertheless for the sake of emphasis in teaching we attempt to define for our students a scientist as one who has lost the capacity (which everyone has as a child) for deluding himself, who loves intellectual honesty, who casts aside his likes and dislikes, parts company with the past, with tradition and authorities and who has learned to see facts not as he wishes them to be, but as they really are. Undoubtedly the scientific discipline can be learned and surely it is the *sine qua non* of intelligent medical practice.

A great deal of emphasis is placed upon mental hygiene because the physician of the future must become a better psychologist and a better psychiatrist. It has been estimated that at least 60 per cent of the patients applying to the average physician in normal times are suffering from some form of neurosis. In times of national stress or economic disturbance the number of such patients is naturally increased. Charles Darwin tells us that his father discovered in his medical practice that what some of his patients desired was not medicine, but an

opportunity for a confidential talk regarding their own problems.

Not infrequently a patient with a nervous breakdown comes to the physician complaining of indigestion, loss of appetite and insomnia. He receives perhaps a thorough physical examination, but if nothing important is found, he is either given a placebo or told that there is nothing really the matter with him. The physician is too busy to look into the patient's attitude to his family, to his job or to society, though he may be utterly maladjusted to all three. The patient cannot be blamed for seeking help elsewhere, usually from a member of some healing cult or from a quack. The fault lies at the door of the medical profession and nowhere else.

The student must be made to see that the mind, the will and the personality are just as important in the practice of medicine as typhoid fever, cholera or smallpox.

The average practitioner today may know how to treat the misbehavior of the liver or stomach, but the great majority are completely unprepared to treat the misbehavior of the individual as a whole.

As a profession we have not as yet fully taken into consideration the mental health in its relation to the physical health of our patients, despite the fact that nothing so quickly affects physical condition as do psychic disturbances and mental maladjustments, and nothing so quickly changes behavior as does our physical condition. Unfortunately, the dead hand of the old doctrine of the dualism of mind and body still seems to clutch the mind of the average practitioner. It prevents him from taking that deep interest in the mental health of his patient which is often essential to physical recovery. The reason for this is that in medical school he spent much time in the study of the embryology of the brain and practically none in the study of the development of the mind. Yet the latter is ten times more useful to the general practitioner than the former. If he cannot successfully treat distorted functions of the brain, it is because he has no adequate knowledge of its normal function. It has not been drilled into him at medical school that the chief function and purpose of the brain is to adapt the individual as a whole to the environment. He deals inadequately with mental maladjustments because he has not been schooled to keep ever before him the central fact that the brain is an organ for the purpose of receiving, recording and subsequently recalling experiences in order to adjust better to new experiences.

Although our brains are well developed long before birth, they do not begin to function as mechanisms of adjustment until the infant is thrust from an enviroment where no adjustment is necessary, where warmth, food and protection are provided by the mother, into a harsh, cold world of reality to which it must slowly begin to adapt, if it is to survive.

By an early but gradual process of training and conditioning in the necessity of facing reality, it is just as important to protect the mind and personality of the growing child from a later attack of, say, adult infantilism, as it is to protect his body against smallpox or typhoid fever by gradually conditioning and training his tissues through vaccination, to resist these infections. These things are commonplaces to the social psychologist, but we teachers of medical students have failed to make full use of the numerous discoveries of modern psychologists.

One doubts, too, that we have stressed sufficiently the importance of the profound bodily changes induced by the emotions of fear, worry, anger, grief, and their effect on the general health of the individual. Dr. Walter B. Cannon, of Harvard, long ago demonstrated experimentally these facts. He has shown that under the influence of deep emotion, the salivary and gastric secretions and the peristaltic motions of the intestines are inhibited. The adrenal gland is also stimulated and there is a consequent rise in blood pressure, a hyperglycemia and glycosuria and a shortening of the coagulation time of the blood. These involuntary reactions are purposive and adaptive responses similar to reflexes, preparing the animal for fight or flight. There is therefore a close relationship between emotional states and bodily changes. Cannon says, in effect, that the influence of the emotions on health is apparent when we realize that one who permits fears, worries or anxieties constantly to disturb the digestive processes and to keep, figuratively speaking, the body on a war footing when there is no war to be waged, to keep the body tense and keyed up when there is nothing to be done, is bound sooner or later to experience that inevitable reaction which we call a nervous breakdown. The reason usually given by the patient and the physician is overwork. The physician at least should know better; it is never that. It is overworry.

Cannon has actually demonstrated that the electrical stimulation of a nerve produces at the

nerve ending a hormone (sympathin) which is absorbed by the blood and affects other structures. This experiment immediately suggests that overstimulation of the central nervous system by worries and anxieties may cause the elaboration of a substance which, if demonstrable, will reveal to us that which very likely may be the chemical and physical basis for the psychoneuroses. Worry indeed may very readily be the cause of an overproduction of an internal secretion which will upset the nervous balance.

HYGIENE OF SOCIETY

Twelve lectures are devoted to the health of the group, of society, because we cannot discharge our full duty to our students unless we emphasize the social aspects of medical practice.

The physician of the future must become a better medical sociologist. He must cultivate and develop his social instincts. He must not only know things; he must know people. He cannot afford to neglect the science of conduct. Social sickness and social ills may be as fatal to a state as the black death. His attitude to his patient must undergo a radical change. He must set aside his individualistic point of view. He must realize that he is not treating John Doe as an individual. John Doe is not simply a case of tuberculosis. John Doe is an integral part of society, an important biologic unit, a part of a greater whole, one piece in a larger design and no physician will discharge his full duty to his community who does not fully visualize this social side of medical practice.

Dr. George R. Minot, of the Boston City Hospital, in discussing "Social Medical Practice" at the ninety-third meeting of the American Association for the Advancement of Science, presented evidence that the social clinic of a hospital improves the work of all clinics and should be on the same plane as other clinics. He stated that modern medical practice makes it imperative that the medical school curriculum should become permeated with training in the social aspects of medicine. In countries where sickness insurance has been tried it has been found that, in a great number of cases, the disturbance we call sickness is more social and economic than pathologic and thus requires economic and social rather than medical treatment.

In Germany an analysis of the morbidity records has shown that the sudden upward rises in the morbidity curve do not indicate deadly epidemics of disease so often as some sort of economic industrial or social change.

The physician of the future must be prepared to disseminate health information and to take a more active part in community affairs. We can hardly expect the public to demand periodic health examinations, for example, unless we ourselves are thoroughly familiar with the advantages of the scientific preventive measures that such an examination should initiate. Fortunately, people generally are beginning to hunger and thirst for the special knowledge that only well-trained physicians possess. We shall invite the misgivings of the public if we fail to take them into our confidence and continue to make a mystery of our profession. The average scientist generally, and the average physician particularly, has traditionally no faith in what many adventurous thinkers have called the supreme intellectual obligation of every scientist, namely, the popularization, the democratization, the humanization or the personalization of knowledge.

Traditionally medical practice and the physician-patient relationship has been a private affair and the physician's ethical code demands that it be kept so. But over against this individualism a new attitude toward the practice of medicine is slowly taking form. There are certain aspects of health, of sickness, and of the work of physicians which seem no longer to be of private interest only. Whether we like it or not, socialized medical and health services are being developed in schools, in industry, in municipal, state and Federal agencies throughout the country. The student of medicine must be exposed to these problems and must be prepared to meet and solve them.

Although the material in some of the lectures is of a highly controversial nature, we believe that when it is presented in an entirely unprejudiced manner it serves a most useful purpose. The student is trained, as far as it is humanly possible by the teacher's example, to assume the true scientific spirit of detachment, to avoid wishful thinking, to inhibit his individual prejudices and to withhold judgment until all the evidence is in. Deliberately he is told not to believe or take for granted one word that is said but rather to challenge and check every statement made. From the orthodox point of view this may be considered a procedure damaging, if not fatal, to professional dignity and integrity, but it does inflame the student's interest

and incites him to think, which is, after all, our chief objective.

In this way a great deal more material is available for consideration at our conference periods than can possibly be taken up. At such times we draw a sharp line between discussions, which are encouraged, and arguments, which are prohibited. Nothing so clarifies thought and promotes straight thinking as good discussion, but on the other hand nothing breeds prejudice faster than heated arguments. The difference between an argument and a discussion lies, as everyone knows, in the emotional attitude of the participants. In the one instance there is a desire to dominate an opponent and to disregard or minimize his point of view, while in the other one tries not only to understand the other fellow's point of view, but to give it equal consideration with his own in arriving at the truth.

In this spirit we can readily approach a subject such as religion and its relation to mental health, which is one that is generally tabooed. Inasmuch as the ethical side of religion deals with human conduct, we maintain that the physician will neglect his duty if he does not step in and stake out his rightful claims in this field. However, as a profession we are not concerned very much with the theological side of religion; in other words, with man's relation to an unseen God. Let us leave that to the ministers. But we are going to be forced to become interested in the ethical side of religion, that is, man's relation to his fellow man, if we are going to preserve our high ideals and our position of leadership in the social organization. Because of our long training in the biological sciences we are better prepared than any other group to understand human behavior and to take conscious control of human conduct.

History reveals that each science has developed from crude and unscientific origins. For example, astronomy grew out of astrology, chemistry from alchemy, medicine from magic, and less than a hundred years ago Lister took surgery away from the barbers and made it a science. Is it not about time that we assumed some responsibility for human conduct and behavior even if it does involve taking away something from our good friends, the ministers? To paraphrase an old Roman, "Nothing human can possibly be foreign to a physician."

Finally, what the student of medicine needs above all else, we would say, is the courage to follow the road toward better individual and social health which the biological sciences, especially psychology and sociology, have unmistakably pointed out.

Southern Medical Journal

JOURNAL OF THE

SOUTHERN MEDICAL ASSOCIATION

Published monthly by the Southern Medical Association, Empire Building, Birmingham, Ala. Annual subscription $4.00. Single copies 35c each.

Entered as second-class matter at the Post Office at Birmingham, Ala., under Act of March 3, 1879. Acceptance for mailing at special rate of postage provided for in Section 1106, Act of October 3, 1917, authorized December 20, 1921.

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Volume 28 APRIL 1935 Number 4

EDITORIAL DEPARTMENT

SOUTHERN MEDICAL ASSOCIATION
Twenty-Ninth Annual Meeting
St. Louis, Missouri, November 19-22, 1935

THE ST. LOUIS MEETING

St. Louis is the largest city within the territory from which the Southern Medical Association draws its membership. It is a recognized medical center, with outstanding men in all the specialties, many of whom are of international reputation. It has two great medical schools, St. Louis University and Washington University, large hospitals and unlimited clinical facilities. The St. Louis Medical Society, host to the Southern Medical Association, has a membership of more than a thousand. It is the largest local medical society in the South.

St. Louis' physical equipment for a large gathering is the best that could be offered. The city has the newest and most modern municipal auditorium in the country, situated within walking distance of all down town hotels, large enough to accommodate comfortably all the scientific sessions and all exhibits. No time will be lost in going from one special gathering to another since the most widely separated meeting places are within two minutes' walk of one another. Hotel facilities are ample for the large attendance of a Southern Medical meeting. There are more than three thousand first class hotel rooms within easy walking distance of the auditorium.

The program arrangement will be similar to that of the last several annual meetings. The official opening will be Tuesday morning, November 19, and the meeting will run through Friday noon, November 22. Tuesday is "St. Louis Day," and will be given over entirely to clinical sessions, five in number, which will run concurrently at the auditorium, all the presentations to be made by members of the St. Louis profession. On Wednesday forenoon, five general clinical sessions will be held, the speakers for which will be men from other parts of the United States. Section meetings will begin Wednesday noon and run in half-day sessions through Friday noon.

The local committees for the St. Louis meeting have been chosen. On pages 392-393 will be found a complete roster of the officers, general and of the sections, of the Southern Medical Association, of associations meeting conjointly, and a complete list of the St. Louis committees for the November meeting. Progress of arrangements so far is all that could be desired.

Of particular interest to the profession of St. Louis and to Southern Medical members will be the regular meeting of the St. Louis Medical Society on Tuesday, April 23, which will be addressed by officers of the Southern Medical Association. Dr. H. Marshall Taylor, Jacksonville, Florida, President of the Association, will discuss "The Hygiene of Swimming" and will present a moving picture film on the subject. In view of the steadily increasing popularity of this sport, his observations are of concern to all physicians. Dr. Irvin Abell, Professor of Surgery of the University of Louisville School of Medicine, a recent past president and a member of the Board of Trustees of the Association, will talk on "Bilateral Renal Calculi," and Dr. M. Pinson Neal, Professor of Pathology of the University of Missouri School of Medicine, member of the Council of the Southern Medical Association and thus official representative of the Association in Missouri, will speak on "What the Southern Medical Association and the St. Louis Meeting Mean to St. Louis and Missouri."

It is not too early for physicians throughout the South to make their plans to attend the St. Louis meeting in November. Every sign is pointing it out as the outstanding medical meeting of the current year.

OBSTETRICAL MORTALITY IN THE UNITED STATES AND ABROAD

In recent years many obstetrical papers have discussed the high puerperal mortality rate of the United States. Much has also been written of the unfairness of comparing the maternal mortality of this country with that of others.

The Children's Bureau has published a report,* "Comparability of Maternal Mortality Rates in the United States and Certain Foreign Countries," which deals with the similarities and differences in methods of assigning cause to deaths associated with pregnancy and childbirth in this and sixteen foreign countries. It is based upon analysis of more than a thousand deaths associated with pregnancy and childbirth that occurred in the United States during the year 1927. Information in regard to deaths of every type and combination of circumstances represented in the United States Bureau of the Census report was sent to statistical offices abroad, and the deaths of the American cases were classified as puerperal or non-puerperal in sixteen foreign countries in accordance with the rules in force in each. The countries which made the assignments of cause of the American deaths were: Australia, Canada, Chile, Czechoslovakia, Denmark, England and Wales, Estonia, France, Irish Free State, Italy, Netherlands, New Zealand, Northern Ireland, Norway, Scotland and Sweden.

It was concluded by Tandy that the methods of assignment in use in Australia, Netherlands, New Zealand and Scotland are similar to those of the United States, and the official maternal mortality rates are directly comparable within a small margin of error. Under the method of Denmark a larger number of deaths would be assigned to the puerperal state and the rate for the United States would be significantly higher than it is now. Under the methods of the other countries included in the study, a smaller number of deaths would be assigned to the puerperal state and the rates for the United States would consequently be somewhat lower.

Differences in methods of assignment were insufficient to explain the high maternal mortality rate of the United States as compared with foreign countries. The official figure of the United States, which in the last few years has exceeded that of every country except Scotland, remains high no matter what method of assignment is used.

Even if the method of the country assigning the smallest proportion of deaths to the puerperal state were in use in the United States, the United States figure would still exceed that of all the countries except Australia, Canada, Chile and Scotland. Rates for the United States estimated in accordance with the assignment procedure of the respective countries are in every instance except Scotland in excess of, and are in five instances more than double, the official rates of the countries themselves.

The report has the backing of statistical authorities, and there is no reason to believe that it cannot be accepted at its face value.

The comparison is, of course, of a given group of deaths as assigned by American, English, French, Danish, Australian, and so on, statisticians. The method of collecting the statistics does not enter into the Tandy report.

Acceptance of the fact that this country has a very high maternal mortality does not imply that such results are entirely or even largely due to its physicians. There is no doubt that physicians can reduce the rate, in this country and elsewhere.

*The study was initiated by the Subcommittee on Prenatal and Maternal Care of the White House Conference on Child Health and Protection. Dr. Elizabeth C. Tandy, Director of the Statistical Division of the Children's Bureau, was chairman of the subcommittee in charge of the study and has written the report, which has the approval of many able people, including Dr. T. F. Murphy, Chief Statistician for Vital Statistics, United States Bureau of the Census.

THE HYPERTENSIVE DIATHESIS

The causes of high blood pressure are many. Hines and Brown,[1] of the Mayo Clinic, say that essential hypertension is dependent upon two causes, a constitutional factor and a wear and tear factor, and they have devised a simple test by which they suggest that the constitutional factor, or tendency to hypertension may be detected early in life, before its symptoms are manifest. The test is conducted as follows:

The subject lies at rest for fifteen minutes or more if necessary, till the blood pressure has reached the basal level. The cuff is placed on one arm and the opposite hand is immersed in ice water. The blood pressure is then taken at the end of thirty seconds and sixty seconds. The hand is removed from the water and readings are made every two minutes till the pressure returns to its previous basal level.

The true hypertensive, according to Hines

1. Hines, Edgar A., Jr.; and Brown, George E.: A Standard Test for Measuring the Variability of Blood Pressure: Its Significance as an Index of the Prehypertensive State. Ann. Int. Med., **7**:209. 1933.

and Brown, has an extremely reactive vasomotor system. His blood pressure rises to an abnormal level in response to a slight stimulus. A small percentage of apparently healthy young persons respond like the hypertensive, giving the same excessive reaction to the test.

The normal maximum rise in systolic pressure they take to be 15 millimeters of mercury. The average rise for patients with hypertension was 35 mm., and practically all essential hypertensives exhibited this excessive blood pressure response to local cold. A small group of healthy young adults with normal blood pressure gave abnormal reactions of about the same degree, and these were called potential hypertensives. In the immediate ancestry of more than three-fourths of them, there was a history of high blood pressure or apoplectic deaths. The test repeated at different intervals gave constant results for the individual. After as much as a week's rest in bed, the reaction was diminished, to return to its previous level when the individual resumed his usual activity.

The negro is subject to every disease that the white man has, and for many diseases his death rate and morbidity are higher. Investigators[2] in Galveston, Texas, have reported that the incidence of hypertensive cardiovascular disease is greater in the negro of this locality than in the white. They undertook to determine whether by Hines and Brown's test the normal negro would show an increased liability to hypertension. A group of 325 young adult whites and negroes was tested and the results were compared. The technic was slightly altered: the patient's hand remained in ice water 150 seconds. All subjects were free from cardiovascular disease and had normal blood pressures, the average being about 115.

The percentage of negroes who gave an excessive reaction was greater than that of the whites, and their rise in blood pressure was considerably higher. For example, 2.9 per cent of the whites showed a rise of systolic pressure to 165, after brief chilling of the hand, and 11.1 per cent of the negroes reached this point. Six-tenths of 1 per cent of the whites reached 170 and 5.2 per cent of the negroes, or nine times as many. One negro's systolic pressure, normal at rest, after this mild stimulus was 200.

According to the Galveston workers,[2] then, a hypersensitive vasomotor mechanism is more frequent in the negro than in the white. Since they have previously reported more hypertensive cardiovascular disease in the negroes of that section, they believe that the finding of increased irritability of the vasomotor system of supposedly normal negroes lends support to Hines and Brown's hypothesis. It is in agreement with their suggestion that the test may be of value in diagnosing a prehypertensive state.

2. Schwab, E. H.; Curb, D. L.; Matthews, J. L.; and Schulze, V. E.: Blood Pressure Response to a Standard Stimulus in the White and Negro Races. Proc. Soc. Exper. Biol. & Med., **32**:583, Jan., 1935.

MATERNAL INSTINCT

The impulse of the female of every species to sacrifice for its young may be destroyed experimentally in a number of ways. Neglect and eating of the offspring by the mother are frequent manifestations of malnutrition in laboratory or farm animals.

The female rat, like other animals, is ordinarily quite indifferent to young not her own. If she receives a series of hormone injections, the active principle being the lactation hormone, prolactin, she will retrieve a young animal placed in the cage, cuddle it or cover with her body, and display other signs of maternal interest not observed in uninjected animals.[1]

Human ethics had its origin in maternal instinct. It rests on control of individual appetite for the sake of others. The first altruistic act of a human being was probably care for its offspring. Riddle, Lahr and Bates[1] have artificially induced protective behavior toward the young. They have synthesized a crude beginning of maternal instinct.

1. Riddle, Oscar; Lahr, Ernest L.; and Bates, R. W.: Maternal Behavior Induced in Virgin Rats by Prolactin. Proc. Soc. Exper. Biol. & Med., **32**:730, Feb., 1935.

TWENTY-FIVE YEARS AGO

FROM JOURNALS OF 1910

PHYSICIANS' TRANSPORTATION

Philadelphia.[2]—"Although I had driven horses for twenty-five years, I turned to the automobile in 1902.

"My first venture was a single-cylinder machine. The trials I had cranking it in both warm and cold weather make me unhappy now when I think of it. Three weeks after I had become its owner I became ambitious and started with my wife for a tour, expecting to get to Buffalo. It began to rain shortly after we started and we ploughed through mud and water some twenty miles until, on a railroad bridge, I thought I had a favorable place to oil up. I stopped the ma-

2. Montgomery, E. E.: The Automobile for the Physician as a Part of His Professional Equipment and as a Means of Pleasure and Recreation. J.A.M.A., **54**:1245, 1910.

chinery, but despite all my efforts, I could not make it go again. Our auto journey ended by our being towed to Trenton, some six miles away, behind a coal wagon.

"My next two ventures were runabouts, two-cylinder machines. * * * I had less trouble with this car. It was rather light weight, however, and as I was pretty heavy, occasionally an axle would break.

"I then went to an electric, which rode beautifully, was ever ready to go, was noiseless, but very limited in its speed and still more so if the batteries had run a little while, so that I found myself following rather than leading—an unsatisfactory position for an ambitious man. I therefore disposed of the electric and secured a touring car. * * * With this machine the tire problem was the greatest. * * * On one journey of twenty miles we blew out four inner tubes. * * * While going at a pretty fair speed my companion * * * saw the shoe which had come off running ahead of us. * * *

"In order to leave no variety of machine untried, my next venture was a steam machine. * * * The driver of a steam machine must keep his mind on what he is doing, * * * he must constantly remember that there must be water in the boiler and not too much of it, and that there must be satisfactory steam pressure and sufficient pressure on the gas. * * *"

Hanover, Pa.[1]—"Previous to April 1, 1907, I used, in my practice, two horses valued at about $500.00. Then I bought a 10 h. p. air-cooled, two-cylinder machine with hard rubber tires. * * *

"The total expense was * * * about $12.23 for one month and $2.82 for every seven days. This is cheaper than shoeing and feeding one horse and keeping buggies in repair."

Mott, North Dakota.[2]—"Being disgusted with the trouble and expense incident to keeping horses, in the spring of 1909 I sold my teams and buggies and purchased a three and a half horse-power single cylinder motorcycle and used it entirely in my practice. During 1909 I drove it over 2,000 miles at about 1 cent per mile with a repair bill of only $1.85.

"To say that I am pleased with the machine is expressing it very mildly. Calls that used to be hard work are now pleasure trips."

VACCINES AND SERUMS

Typhoid.[3]—"Whatever effect the vaccines may have on the original disease [typhoid fever] there can be little doubt that the percentage of relapses can be much reduced by bacterial inoculation. * * *

"The possible use of vaccines in typhoid fever, for the cure of the typhoid carrier, has been suggested. * * * bacilli were found in the [patient's] urine seven years after the original disease. After three months' treatment with inoculation the bacilli disappeared and did not return.

"The use of neoformans vaccines in the treatment of malignant tumors has been advocated, especially by Wright. * * *

"There can be little doubt that infections of the urinary tract due to the colon bacillus are favorably affected by vaccine treatment. The subjective improvement is oftentimes striking, and pain and frequency of micturition are quickly relieved."

Antistreptococcus and Antipneumococcus Serums.[5]—"* * * The claims for the usefulness of antistreptococcus and antipneumococcus serums rest on impressions from results in clinical cases in man, and have in most cases no foundation whatsoever in experimental tests."

1. Wentz, A. C.: Ibid. p. 1246.
2. Rucker, F. T.: Ibid. p. 1253
3. Richardson, Mark W.: Vaccine Therapy: General Principles. J.A.M.A., **54**:255, 1910.
5. Hektoen, L.; Weaver, G. H.; and Tunnicliff, R.: Preliminary Report of Investigations of Serums and Vaccines. J.A.M.A., **54**:257, 1910.

Book Reviews

The Laboratory Notebook Method in Teaching Physical Diagnosis and Clinical History Recording. By Logan Clendening, M.D., Professor of Clinical Medicine in the University of Kansas. 71 pages. St. Louis: The C. V. Mosby Company, 1934. Paper, 50 cents.

The student using this guide in the taking of the history and the making of the physical examination will in a short time develop a routine technic. The explanatory notes point out various details that the examiner should observe during the examination. A satisfactory procedure and one which will benefit the student.

The 1934 Year Book of General Surgery. Edited by Evarts A. Graham, A.B., M.D., Professor of Surgery, Washington University School of Medicine; Surgeon-in-Chief of the Barnes Hospital and of the Children's Hospital, St. Louis. 815 pages, illustrated. Chicago: The Year Book Publishers, 1934. Cloth, $3.00.

Anesthesia continues to be the subject of many articles, attention being given by H. O. Nolan to the use of hydroquinone to prevent the decomposition of ether. The spontaneous regression of cancer is discussed by J. L. DeCourcy Cancer of the lip with a report of seventy-seven cases by O. R. Hyndman and a paper by Blair and Brown taking up the treatment of cancerous and potentially cancerous cervical nodes should be read together. Cancer of the breast has received careful attention in regard to metastases and end results. Penetrating wounds of the chest are the subject of two articles. The problem of thyroidectomy for cardiac affections receives further discussion in this volume. A particularly interesting treatment of roentgen diagnosis by J. C. Bell with a long discussion by E. A. Graham on appendicitis is given. J. G. Probstein discusses pyogenic infections of the terminal phalanx. Treatment of burns by immersion in a tub is being revived. There is also a trend toward less drainage in cases of appendicitis and peritonitis. These and many other well chosen articles give the reader an impression of what is new in the field of surgery and diagnosis.

How to Practice Medicine. By Henry W. Kemp, M.D. 156 pages. New York: Paul B. Hoeber, Inc., 1935. Cloth, $2.50.

The writer admits being dogmatic, and he is, even going so far as to name the make of automobile the tyro should buy. The groundwork is laid with discussions of choosing a place to practice, outfitting the office, relationships to maid, druggist and fellow prac-

titioners. Then follow expositions on office consultations, house calls, referred cases, religion, nurses, confinements. The appendix which contains a number of useful prescriptions. An outstanding injunction, "Never lie to a child," should be remembered by every physician. The book cannot cover medicine as practiced in all localities, but will be a help to the young physician.

Head Injuries. By L. Bathe Rawling, M.B., B.Ch. (Cantab.), F.R.C.S., Consulting Surgeon to St. Bartholomew's Hospital and to the West End Hospital for Nervous Diseases. 86 pages, illustrated. New York: Oxford University Press, 1934. Cloth, $2.75.

This little volume is both concise and dogmatic. It will have to remain for the reader to determine if these are virtues. Certainly this reviewer does not consider them so.

Entirely too much space is given over to the consideration of fractures of the skull, nearly one-third of the entire volume. In recent years the fracture has been considered only incidental in head injuries; the question of brain trauma and increasing intracranial pressure being the points of paramount interest to the surgeon.

When the author states that all head injuries should have lumbar puncture routinely, it is necessary to protest. This is too sweeping a statement even for those who favor lumbar puncture at times. For the many who feel that as much information can be obtained from careful and frequently repeated neurological examinations, the statement is a distinct shock.

In the list of complications following head injury, brain abscess is omitted. This is not of such rarity as to be ignored.

In the preface one reads that the book was written in the Balearic Isles far away from all references. This, one can easily believe.

Infantile Paralysis. By George Draper, M.D., Associate Professor of Clinical Medicine, College of Physicians and Surgeons, Columbia University. 167 pages, illustrated. New York: D. Appleton-Century Company, 1935. Cloth, $2.00.

This is particularly adapted to the layman's view of poliomyelitis and of interest to field workers in epidemics of infantile paralysis. Instructive graphs illustrate the author's ideas. The discussion of the human factor in susceptibility or the converse, with its bearing on individual resistance to the disease, is a major part of the text. A frank appraisal of the value of immunizing and curative sera is given. It is an attempt to put anterior poliomyelitis or infantile paralysis in a true light from the layman's viewpoint and to clear up some of the moot questions in connection with the disease. To quote the author himself, "It is a book telling an unfinished story."

Observations of a General Practitioner. By William N. Macartney, M. D. Massachusetts: Richard G. Badger, publisher. 478 pages, illustrated. 1935, cloth.

Dr. Macartney reminisces his way through chapter after chapter, using aphorisms, jokes and homely language to give the reader an engaging text on medicine that resembles a novel. There are very few common conditions that the author does not mention, with a description of his treatment. While some of the drugs used, for instance veratrum viride, are rather old-fashioned and a little dangerous, he avers that the results in his hands have all been good. The book is worth reading for the viewpoints and wisdom of an older man.

The Heart Visible. By J. Polevski, M.D., Attending Physician and Cardiologist, Newark Beth Israel Hospital. 207 pages. Philadelphia: F. A. Davis Company, 1034. Cloth, $5.00.

In the application of the x-ray to the study of cardiovascular diseases, American clinicians have lagged far behind their European colleagues. Relatively few volumes dealing with this subject are available in English. For this reason Polevski's book may be expected to serve a useful purpose. The first section is devoted to methods, the second to the normal heart, the third to abnormal conditions of the heart, the fourth to pericardial disorders, and the final section is concerned with diseases of the great vessels. The book is clearly written and contains numerous excellent photographs. In the discussion of the various conditions which produce roentgenographic abnormalities, brief presentations of the important clinical features are appended. Although the author appears to be over enthusiastic concerning the value of the x-ray, his book contains much useful information presented in a clear and readable style.

Illustrative Electrocardiography. By Joseph H. Bainton, A.B., M.D., Attending Physician and Chief of the Cardiac Clinic, Morrisania City Hospital, New York City, and Julius Burstein, A.B., M.D., Associate Electrocardiographer, Morrisania City Hospital, New York City. 257 pages, illustrated. New York: D. Appleton-Century Company, 1935. Cloth, $5.00.

This little book contains a rather complete group of photographs which cover the range of electrocardiographic variations in health and disease. There is very little descriptive matter, but the material presented covers satisfactorily the essentials of the subject. It can be recommended to physicians who desire records illustrating various abnormalities for comparison with their own records.

The 1934 Year Book of Pediatrics. By Isaac A. Abt, S.Sc., M.D., Professor of Pediatrics, Northwestern University Medical School. With the Collaboration of Arthur F. Abt, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School. 541 pages, illustrated. Chicago, Illinois: The Year Book Publishers, 1935. Cloth.

This is a comprehensive review of important and worthwhile contributions to pediatric literature for the year 1934.

It includes excellent articles on the premature infant, and the management of infants in the first three months of life. Space is devoted to recent advances in infectious diseases, especially the serum treatment of poliomyelitis and the new vaccine developed for immunization against this disease. There is an excellent article on diagnosis and treatment of the anemias of infants.

The publishers are to be congratulated on having Isaac Abt as editor of its Year Book of Pediatrics,

BOOK REVIEWS continued on page 393

OFFICERS SOUTHERN MEDICAL ASSOCIATION,
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American Public Health Association, Southern Branch (meeting conjointly with Southern Medical Association)—Dr. C. E. Waller, President, Washington, D. C.; Mr. V. M. Ehlers, First Vice-President, Austin, Texas; Dr. I. C. Riggin, Second Vice-President, Richmond, Virginia; Miss Ruth Mettinger, Third Vice-President, Jacksonville, Florida; Dr. G. F. McGinnes, Secretary-Treasurer, Richmond, Virginia.

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American Academy of Pediatrics, Region 2 (meeting conjointly with Southern Medical Association)—Dr. Edward Clay Mitchell, Chairman, Memphis, Tennessee.

Society for Experimental Biology and Medicine, Southern Section (meeting conjointly with Southern Medical Association)—Dr. Charles F. Craig, Chairman, New Orleans, Louisiana; Dr. Meyer Bodansky, Vice-Chairman, Galveston, Texas; Dr. Roy H. Turner, Secretary, New Orleans, Louisiana.

Southern Association of Anesthetists (meeting conjointly with Southern Medical Association)—Dr. H. Boyd Stewart, President, Tulsa, Oklahoma; Dr. Mary E. Hopkins, First Vice-President, Louisville, Kentucky; Dr. D. P. Harris, Second Vice-President, Beaumont, Texas; Dr. W. Hamilton Long, Secretary-Treasurer, Louisville, Kentucky.

Women Physicians of the Southern Medical Association—To be named.

Woman's Auxiliary to the Southern Medical Association—Mrs. J. Bonar White, President, Atlanta, Georgia; Mrs. Oliver W. Hill, President-Elect, Knoxville, Tennessee; Mrs. Frank N. Haggard, First Vice-President, San Antonio, Texas; Mrs. W. K. West, Second Vice-President, Oklahoma City, Oklahoma; Mrs. Francis E. LeJeune, Recording Secretary, New Orleans, Louisiana; Mrs. Eustace A. Allen, Corresponding Secretary, Atlanta, Georgia; Mrs. A. G. Wilde, Treasurer, Jackson, Mississippi; Mrs. Southgate Leigh, Historian, Norfolk, Virginia; Mrs. Edward Jelks, Parliamentarian, Jacksonville, Florida.

ST. LOUIS MEDICAL SOCIETY—Host to the Southern Medical Association, Twenty-Ninth Annual Meeting, November 19-22, 1935.

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Publicity—Dr. R. V. Powell, Chairman, Dr. L. P. Gay, Dr. Cleveland H. Shutt, and Dr. Peter Wenzel.

Exhibits—Dr. Leland B. Alford, Chairman, Dr. Omer E. Hagebusch, Dr. C. H. Crego, and Dr. R. C. McElvain.

Alumni Reunions, Etc.—Dr. E. C. Ernst, Chairman, Dr. Daniel L. Sexton, Dr. D. K. Rose, and Dr. Clinton W. Lane.

Membership—Dr. R. A. Woolsey, Chairman, Dr. I. H. Boemer, Dr. J. Albert Key, and Dr. Richard Weiss.

Program or Clinics—Dr. Alphonse McMahon, Chairman, Dr. Fred Jostes, Dr. Armand D. Fries, and Dr. A. E. Strauss.

Information—Dr. F. D. Gorham, Chairman, Dr. Arthur Gundlach, and Dr. F. G. A. Bardenhier.

Transportation—Dr. P. N. Davis, Chairman, Dr. Samuel B. Grant, Dr. August A. Werner, and Dr. Louis H. Jorstad.

Lanterns—Dr. C. H. Eyermann, Chairman, Dr. Ronold Gzell, Dr. Ralph S. Muckenfuss, and Dr. Paul F. Titterington.

Golf—Dr. Arthur M. Alden, Chairman, Dr. J. Edgar Stewart, and Dr. E. Lawrence Keyes.

Trap Shooting—Dr. Charles D. O'Keefe, Chairman, Dr. James Barrett Brown, and Dr. O. R. Sevin.

Women Physicians—Dr. Katherine Schaaf.

Ladies' Entertainment—Woman's Auxiliary to the St. Louis Medical Society, Mrs. F. S. Haeberle, President. Mrs. Joseph M. Trigg, President-Elect.

BOOK REVIEWS continued from page 391

whose comments go far to make the text both interesting and instructive. He is now joined by his son, Arthur Abt, as collaborator. This annual resume of advances in pediatrics will be a valuable addition to one's library so long as such men as these are available as editors.

Aids to Obstetrics. By Leslie Williams, M.D., M.S. (Lond.), F.R.C.S. (Eng.), M.C.O.G., Obstetric Surgeon to Out-Patients, St. Mary's Hospital; Surgeon, Queen Charlotte's Hospital, London, etc. Tenth edition. 219 pages. Baltimore, Maryland: William Wood & Co., 1934. **Cloth.**

This book follows the English procedure in obstetrical care. Among the more noticeable differences in usages are: the giving of the obstetrical measurements in inches instead of centimeters, the late weaning and late addition of food other than mother's milk to the babies' diet, the intra-uterine douches and the instillation of fluids into the uterus. Ante-natal care is dismissed with a very inadequate presentation. The writer makes the statement: "Except in case of employment of Kielland's forceps in the hands of an expert specially skilled in their use, the forceps is never used to rotate the fetal head." This is neither true nor taught in this country. The chapter on anesthesia should give more attention to the use of local anesthesia, at least in the repair of lacerations.

Aids to Operative Surgery. By Cecil P. G. Wakeley, D.Sc. (Lond.), F.R.C.S. (Eng.), F.R.S. (Edin.); Senior Surgeon, King's College Hospital. Second Edition. 225 pages. Baltimore, Maryland: William Wood & Co., 1934. Cloth.

This compend gives the reader a bird's-eye view of operative surgery. A single operation is described for each condition. The book is satisfactory for reviewing before an examination.

Standard Classified Nomenclature of Disease. Compiled by the National Conference on Nomenclature of Disease and Edited by H. B. Logie, M.D., C.M., Executive Secretary. 870 pages. New York: The Commonwealth Fund, 1935.

Changes have been made throughout the book as they were shown to be needed by the users of the nomenclature. Extensive changes have been made in the sections on endocrinology, neurology, diseases of the cardiovascular system and diseases of the musculoskeletal system. The index now contains nearly 15,000 items. Almost five hundred hospitals are using the nomenclature and it has been proven of value in teaching medical students, especially during their hospital clerkship. It is hoped that this revision is so complete that no change will be necessary for a long period of time.

Dr. Colwell's Daily Log for Physicians. A Brief, Simple, Accurate Financial Record for the Physician's Desk. Champaign, Illinois: Colwell Publishing Company, 1935.

This system seems to be superior to others in time saving and efficiency. It is complete in every detail.

Southern Medical News

ALABAMA

Dr. H. Marshall Taylor, Jacksonville, Florida, President of the Southern Medical Association, visited the headquarters of the Association in Birmingham in March. While in Birmingham Dr. Taylor was officially honored by a luncheon attended by a hundred physicians.

The American College of Surgeons held their Southern sectional meeting in Birmingham March 7 and 8, with headquarters at the Tutwiler Hotel.

Dr. Warren S. Baldwin and Mrs. Ada Simpson Smollen, both of Birmingham, were married February 2.

Dr. Edward A. Thorne, Scottsboro, and Miss Ruth O'Hare were married January 12.

Deaths

Dr. Nathan R. Phillips, Piper, aged 57, died December 19 of cerebral hemorrhage.

Dr. Howell Lea Castleman, Sylacauga, aged 64, died recently.

ARKANSAS

The Pulaski County Medical Society recently honored Dr. Fergus O. Mahony, El Dorado, President of the Arkansas Medical Society, with a dinner meeting.

Deaths

Dr. Joseph A. Kowalewski, Barling, aged 44, died January 17 as the result of injuries received in an automobile accident.

Dr. Virgil Lynn Pascoe, Newark, aged 63, died January 28 of lobar pneumonia.

Dr. William C. Everett, Hazen, aged 68, died December 28.

Dr. John C. Hafford, Black Oak, aged 63, died December 22.

DISTRICT OF COLUMBIA

The District of Columbia-Maryland-Delaware-Virginia-West Virginia sectional meeting of the American College of Surgeons will be held in Washington, D. C., April 11 and 12 at the Mayflower Hotel.

The Osler Medical Society elected the following officers for the coming year: Dr. John Minor, Washington, President; Dr. Fred R. Sanderson, Washington, Vice-President; Dr. E. Kirby Smith, Washington, Secretary-Treasurer.

The George M. Kober Medical Society elected the following officers for the coming year: Dr. Ernest E. Hadley, Washington, President; Dr. Herbert H. Schoenfeld, Washington, Vice-President; Dr. Howard L. Smith, Washington, Secretary; Dr. Don Johnson, Washington, Treasurer.

Dr. Irwin Grier Linton, Washington, and Miss Nancy McMorries Moffatt were married December 29.

Deaths

Dr. Joseph Hammond Bryan, aged 79, died February 3.

FLORIDA

The St. Johns County Medical Society elected the following officers for the coming year: Dr. Reddin Britt, St. Augustine, President; Dr. Charles C. Green, St. Augustine, Vice-President; Dr. John L. Bennett, St. Augustine, Secretary; Dr. Walter G. Potter, St. Augustine, Treasurer.

The Pasco-Hernando-Citrus County Medical Society elected the following officers for the coming year: Dr. A. C. Coogler, Brooksville, President; Dr. J. T. Bradshaw, Lake Jovita, and Dr. P. J. Hudson, Crystal River, Vice-Presidents; Dr. John J. Bourke, Dade City, Secretary-Treasurer.

The DeSoto-Hardee-Highlands County Medical Society elected the following officers for the coming year: Dr. Charles H. Kirkpatrick, Arcadia, President; Dr. Ben D. Spears, Wauchula, Vice-President; Dr. L. W. Martin, Sebring, Secretary-Treasurer.

The Broward County Medical Society elected the following officers for the coming year: Dr. O. C. Brown, Fort Lauderdale, President; Dr. Ralph Lingeman, Fort Lauderdale, Vice-President; Dr. Robert E. Blount, Fort Lauderdale, Secretary-Treasurer.

The Southeastern Surgical Congress, under the Presidency of Dr. Gerry R. Holden, Jacksonville, had its annual meeting in Jacksonville in March. New Orleans was selected for the 1936 meeting. Dr. William D. Haggard, Nashville, President-Elect, became President, Dr. C. Jeff Miller, New Orleans, was made President-Elect, and Dr. B. T. Beasley, Atlanta, was reelected Secretary-Treasurer.

The Duval County Medical Society had as guest speaker at their meeting on February 5 Dr. David D. Berlin, of Boston.

Colonel Raymond Sanderson, Jacksonville, has been ordered to Candler Field, Atlanta, for active duty training in the Medical Reserve as Flight Surgeon.

Dr. L. W. Elgin, Miami, has moved to the Ingraham Building.

Dr. Francisco M. Fernandez, formerly of Havana, Cuba, has opened offices in the Ingraham Building, Miami.

Dr. Terry Bird, Panama City, and Miss Eleanor Conner were married December 30.

Dr. Wilburn C. Young, Canal Point, and Mrs. Evelyn Logsdon were married December 31.

Dr. Joe Ivey Turberville, Century, and Miss Ellen Virginia Burns were married January 25.

Deaths

Dr. MacCrellous Price Sporman, Manatee, aged 42, died January 1.

Dr. Albert Henry Kleiser, Orlando, aged 75, died December 27 of hypostatic pneumonia.

Dr. Walter Evan Lee, Clearwater, aged 56, died November 23 of leukemia and secondary anemia.

Dr. Lester Reginald Weeks, Trenton, aged 57, died December 26.

Dr. Julius Tyndale Westerman, Miami, aged 63, died January 27 of thrombosis.

GEORGIA

The Bartow County Medical Society elected the following officers for the coming year: Dr. R. E. Adair, Cartersville, President; Dr. H. B. Bradford, Pine Log, Vice-President; Dr. W. E. Wofford, Cartersville, Secretary-Treasurer.

The Dougherty County Medical Society elected the following officers for the coming year: Dr. H. M. McKemie, Albany, President; Dr. F. K. Neill, Albany, Vice-President; Dr. Alex R. Freeman, Albany, Secretary-Treasurer.

The Taylor County Medical Society elected the following officers for the coming year: Dr. S. H. Bryan Reynolds, President; Dr. Lewis Beason, Butler, Vice-President; Dr. R. C. Montgomery, Butler, Secretary-Treasurer.

The Coffee County Medical Society elected the following officers for the coming year: Dr. J. G. Crovatt, Douglas, President; Dr. T. H. Johnston, Douglas, Secretary-Treasurer.

The Jefferson County Medical Society elected the following officers for the coming year: Dr. J. J. Pilcher, Wrens, President; Dr. S. C. Ketchin, Louisville, Vice-President; Dr. S. T. R. Revell, Louisville, Secretary-Treasurer.

The Franklin County Medical Society elected the following officers for the coming year: Dr. Stewart D. Brown, Royston, President; Dr. B. T. Smith, Carnesville, Secretary-Treasurer.

The Richmond County Medical Society elected the following officers for the coming year: Dr. G. Lombard Kelly, Augusta, President; Dr. J. H. Sherman, Augusta, Vice-President; Dr. R. C. McGahee, Augusta, Secretary-Treasurer.

The Ocmulgee Medical Society elected the following officers for the coming year: Dr. W. F. Massey, Chester, President; Dr. J. F. Powell, Gresston, Vice-President; Dr. I. J. Parkerson, Eastman, Secretary-Treasurer.

The Meriwether County Medical Society elected the following officers for the coming year: Dr. W. P. Kirkland, Manchester, President; Dr. T. W. Jackson, Manchester, Vice-President; Dr. R. B. Gilbert, Greenville, Secretary-Treasurer.

The Habersham County Medical Society was entertained on January 10 by Dr. and Mrs. H. E. Crow, Alto.

The Lowndes County Medical Society was recently entertained at dinner by Dr. E. J. Smith and Dr. J. R. Smith, Hahira.

Dr. Roy R. Kracke, Pathologist of Emory University School of Medicine, was recently awarded the Ward-Burdick Medal for research work on the cause of agranulocytosis which he began five years ago.

The University of Georgia Medical Department recently re-

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CHRONIC "ILL HEALTH" LAID TO VITAMINE DEFICIENCY at Yale University

BREWERS' YEAST POWDER

DR. GEO. R. COWGILL says:
Chronic ill health may result from a small shortage of vitamin B; and men need more than women.

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(Jr. A.M.A., July 9, 1932)
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(Jr. A.M.A., Nov. 14, 1931)
"Restricting diets for therapeutic purposes carries with it the danger of provoking deficiency diseases and this must be guarded against by thoughtful planning."

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Continued from page 394

ceived notice of a gift of $18,000 for the Medical School from Mrs. John W. Herbert, of New York City and Augusta.

Dr. M. E. Winchester, Brunswick, has been elected Commissioner of Health for Glynn County for a term of four years.

Dr. Frank K. Boland, Jr., Atlanta, recently spent several weeks in Rochester, Minnesota, doing postgraduate work in surgery at the Mayo Clinic.

Dr. William A. Smith, Atlanta, was recently elected to membership in the American Neurological Association.

The Fulton County Medical Society had as guest speaker at a recent meeting Dr. Walter L. Bierring, Des Moines, Iowa, President of the American Medical Association.

Dr. William G. Hamm, formerly of St. Louis, has announced the opening of offices in the Medical Arts Building, Atlanta, for the practice of oral and plastic surgery.

Dr. Robert Henry DeJarnette, Dahlonega, and Miss Mary Lou Gates were married December 27.

DEATHS

Dr. Marion O. Fulcher, Waynesboro, aged 64, died January 16 of carcinoma of the esophagus.

Dr. Sidney Walker, Dublin, aged 55, died January 22 of atrophic cirrhosis of the liver.

Dr. William David Sloan, Stockton, aged 55, died January 10 of chronic nephritis and heart disease.

Dr. Alfred S. Oliver, St. Marys, aged 77, died November 20 of arteriosclerosis.

Dr. Cicero Holcomb Cox, Waynesboro, aged 68, died January 17 of pneumonia.

Dr. Lee W. Wheeler, Kite, aged 64, died January 14.

Dr. John R. Perry, Atlanta, aged 80, died January 24.

Dr. Ezekiel Z. Hurst, Alma, aged 42, died January 10.

KENTUCKY

The Caldwell County Medical Society elected the following officers for the coming year: Dr. W. C. Haydon, Princeton, President; Dr. Clinton B. Walker, Princeton, Vice-President; Dr. W. L. Cash, Princeton, Secretary-Treasurer.

The Grant County Medical Society elected the following officers for the coming year: Dr. J. J. Marshall, Crittenden, President; Dr. A. D. Blaine, Dry Ridge, Vice-President; Dr. C. A Eckler, Dry Ridge, Secretary-Treasurer.

The Warren County Medical Society elected the following officers for the coming year: Dr. R. C. Moss, Rockfield, President; Dr. C. E. Francis, Bowling Green, Vice-President; Dr. Hal Neel, Bowling Green, Secretary-Treasurer.

DEATHS

Dr. James Wesley Ellis, Owensboro, aged 88, died January 4 of senility.

Dr. William S. Golden, Worthville, aged 76, died January 18 of angina pectcris.

Dr. George W. Bushong, Tompkinsville, aged 62, died January 7 of pneumonia.

Dr. Lee Maupin, Hodgenville, aged 62, died January 12 of heart disease.

Dr. William Emmett Allen, Harrodsburg, aged 54, died November 2 of shock following an operation for intestinal obstruction.

Dr. John Wilson Strother, Grayson, aged 83, died January 8 of senility.

Dr. Zachary T. Gabbert, Casey Creek, aged 85, died December 22 of gangrene of the left foot and bronchopneumonia.

Dr. Thomas J. Acton, Eubank, aged 70, died January 23 of pneumonia.

Dr. Will C. Strother, Bowling Green, aged 64, died January 29 of heart disease.

Dr. Lafayette Skaggs, Russell, aged 73, died January 15 of myocarditis and hypertension.

LOUISIANA

The Southeastern Surgical Congress, at its annual convocation in Jacksonville, Florida, in March, selected New Orleans as its meeting place for 1936, and elected Dr. C. Jeff Miller, New Orleans, President-Elect.

Dr. F. E. LeJeune, of the faculty of the Graduate School of Medicine of the Tulane University of Louisiana, was a guest speaker at the meeting of the American Laryngological, Rhinological and Otological Society at Dallas, Texas, recently.

The Orleans Parish Medical Society commemorated the one

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HARVARD MEDICAL SCHOOL

COURSES FOR GRADUATES

Common Problems of Internal Medicine
June 19-July 31 (6 weeks). Massachusetts General Hospital. Fee, $200.

Modern Diagnosis and Treatment of Heart Disease
July 1-31. Peter Bent Brigham Hospital. Fee, $125.

Pediatrics
July 1-31. Fee, $125.

Cardiology — Advanced Cardiology
Cardiology, August. Advanced Cardiology, September. Fees, $150 per course.

For further information regarding the above courses apply to Assistant Dean Courses for Graduates, HARVARD MEDICAL SCHOOL, Boston, Mass.

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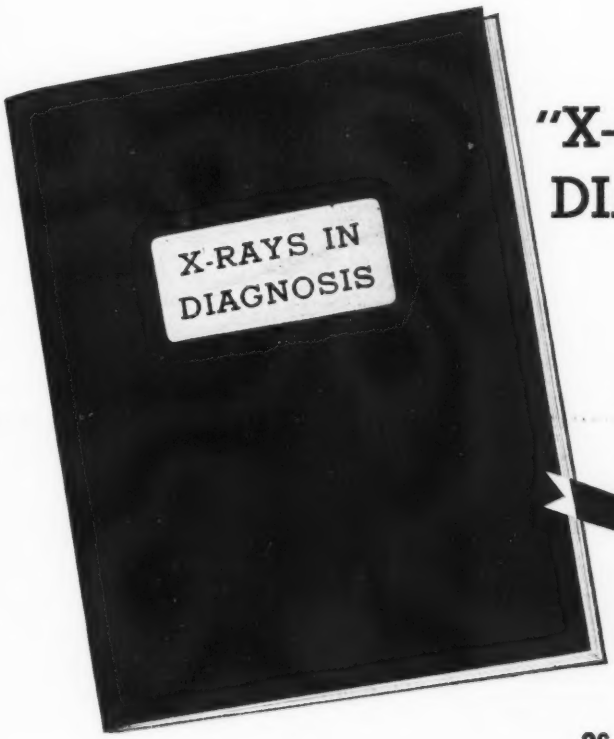

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City and State _____

Continued from page 24

hundredth anniversary of the establishment of Tulane University of Louisiana School of Medicine with a special program recently.

DEATHS

Dr. Charles Thomas DeLoach, Sarepta, aged 54, died December 25 of cerebral hemorrhage.

Dr. Lucius D. McGehee, Hammond, aged 64, died January 30 of pneumonia.

MARYLAND

Dr. Arthur M. Shipley has resigned from the staff of the Baltimore City Hospitals on account of increased duties at the University of Maryland School of Medicine, where he is Professor of Surgery.

Dr. Frank G. Boudreau, Geneva, Switzerland, of the Health Section of the League of Nations, gave a public lecture at the School of Hygiene and Public Health of Johns Hopkins University recently on "Medical Care Here and Abroad."

Dr. John E. Dees and Dr. Myrta Susan Coons, both of Baltimore, were married January 7.

DEATHS

Dr. John Daniel Smetzer Young, Graceham, aged 72, died recently following an operation for the removal of the prostate.

Dr. Stanley James Tilghman, Easton, aged 36, died January 14 as the result of an automobile accident.

Dr. Marshall G. Smith, Arnold, aged 70, died January 21 of influenza.

Dr. Edward Harris, Cumberland, aged 55, died January 22 of pneumonia.

Dr. Charles Carroll Habliston, Baltimore, aged 44, died January 17 of heart disease.

Dr. James Melvin Delevett, Baltimore, aged 62, died January 18 of pneumonia.

MISSISSIPPI

Dr. J. C. McGuire, formerly of Somerset, Kentucky, has been appointed Director of the Copiah County Health Unit to succeed Dr. J. T. Googe, who was transferred to Jacksonville, Florida.

DEATHS

Dr. William O. Mabry, Goodman, aged 61, died December 27.

Dr. I. P. Burdine, Amory, aged 70, died recently.

Dr. Jacob Nathaniel Rape, Moss Point, aged 76, died February 4 of angina pectoris.

MISSOURI

The Jasper County Medical Society elected the following officers for the coming year: Dr. W. S. Loveland, Joplin, President; Dr. J. L. Sims, Joplin, Vice-President; Dr. J. W. Hardy, Joplin, Secretary; Dr. H. D. McGaughey, Joplin, Treasurer.

The Boone County Medical Society elected the following officers for the coming year: Dr. W. P. Dysart, Columbia, President; Dr. W. O. Fischer, Columbia, Vice-President; Dr. Maurice E. Cooper, Columbia, Secretary.

The Ste. Genevieve County Medical Society elected the following officers for the coming year: Dr. G. M. Rutledge, Ste. Genevieve, President; Dr. J. A. Wilkins, St. Mary's, Vice-President; Dr. R. W. Lanning, Ste. Genevieve, Secretary-Treasurer.

The Randolph-Monroe County Medical Society elected the following officers for the coming year: Dr. C. C. Smith, Moberly, President; Dr. G. I. Allen, Moberly, Vice-President; Dr. M. E. Kaiser, Moberly, Secretary-Treasurer.

The Clay County Medical Society elected the following officers for the coming year: Dr. Harry Staley, North Kansas City, President; Dr. J. A. Howell, Excelsior Springs, Vice-President; Dr. Eugene B. Robichaux, Excelsior Springs, Secretary-Treasurer.

Continued on page 28

MAINTAIN MINERAL ALKALI BALANCE WITH KALAK

Hypertonic — Alkaline — Carbonated — Not Laxative

The years of experience with physicians who have used Kalak show that the use of a formula containing calcium, magnesium, sodium and potassium salts represents a correctly balanced solution. This is Kalak which, as such, aids in maintaining a balanced base reserve.

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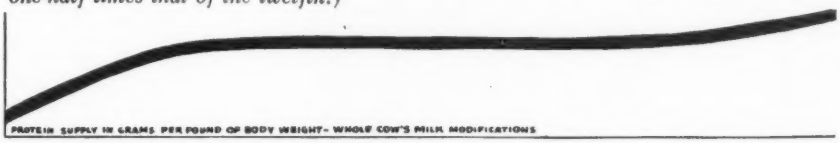
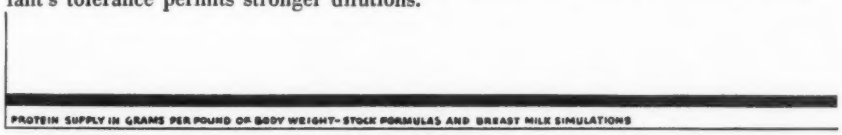
Protein Value Curves of Common Feeding Methods—A Comparison

PROTEIN VALUE CURVE OF BREAST MILK. The protein value of breast milk is *highest at the beginning of lactation* and diminishes throughout the nursing period. Thus Nature provides for the critical first months when growth is most rapid. (*During the second month of life the rate of growth is double that of the eighth month, two and one-half times that of the twelfth.*)



THE PROTEIN VALUE CURVE OF FLUID MILK, as progressively modified, is the reverse of that for breast milk. Weak dilutions at the start are necessary to adjust the curd, buffer, and fat of cows' milk to the digestive capacity of the infant. Lowest during the early months of most rapid growth, the protein curve rises only as the infant's tolerance permits stronger dilutions.



PROTEIN VALUE CURVE OF "STOCK" FORMULAS OR "SIMULATED" BREAST MILKS. Because of its fixed composition, the stock formula presents a horizontal line for its protein value curve. Even if parity with the physiological value of breast milk could be achieved in a stock formula, such a formula would be ideal only during that particular phase of mother's milk on which it is patterned.

THE PROTEIN VALUE CURVE OF DRYCO FEEDINGS PARALLELS THAT OF BREAST MILK. The Dryco method of drying so increases digestibility that protein values even greater than those of undiluted whole milk are frequently fed at birth. Ample protein for growth is thus assured during the early months. As the need for protein diminishes and that for energy foods increases, added carbohydrate depresses the Dryco protein value curve.

We will gladly send, at your request, suggested formulas embodying this feeding principle.

Made from superior quality milk from which part of the butterfat has been removed, irradiated by the ultra-violet ray, under license by the Wisconsin Alumni Research Foundation (U. S. Pat. No. 1,680,818) and then dried by the "Just" Roller Process.

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HORLICK'S MALTED MILK CORP.
RACINE, WIS.

Continued from page 26

The Greene County Medical Society elected the following officers for the coming year: Dr. Wallis Smith, Springfield, President; Dr. R. F. Williams, Springfield, Vice-President; Dr. John W. Williams, Jr., Springfield, Secretary.

Dr. M. Pinson Neal, Columbia, was a speaker at the Mid-South Postgraduate Medical Assembly meeting at Memphis, Tennessee, February 14.

Dr. C. E. Burford, St. Louis, was a speaker at a meeting of the Academy of Medicine at Toledo, Ohio, February 1.

Dr. August A. Werner, St. Louis, was guest speaker at the meeting of the Morgan County, Illinois, Medical Society on February 14.

Dr. J. Curtis Lyter, St. Louis, was guest speaker at the meeting of the Sangamon County, Illinois, Medical Society January 3.

Dr. R. G. Leland, Chicago, Director of the Bureau of Medical Economics of the American Medical Association, was guest speaker at a special meeting of the St. Louis Medical Society on February 18.

Dr. Edwin L. Sheahan, Clayton, has been appointed Superintendent of the St. Louis County Hospital, succeeding Dr. William G. Patton.

Dr. Fred W. Bailey, St. Louis, has been appointed a member of the Missouri State Board of Health, succeeding Dr. Emmett P. North, St. Louis.

Dr. James L. Mudd, St. Louis, has been appointed Tuberculosis Controller of St. Louis, succeeding Dr. H. I. Spector, St. Louis.

Deaths

Dr. Agnes McKee Wallace, Buell, aged 83, died December 28 of arteriosclerosis.

Dr. David Ulysses Sherman, Springfield, aged 63, died January 22 of cerebral sclerosis following fracture of the leg.

Dr. Douglas Wyatt, New Florence, aged 57, died January 11 of pneumonia.

Dr. Charles Lucien Lavender, Columbia, aged 74, died December 3 of heart disease.

Dr. Foster Wande Burke, Laclede, aged 60, died January 3 of heart disease.

Dr. Anton George Frye, St. Louis, aged 72, died December 24.

Dr. William T. Bell, Stoutsville, aged 76, died January 17 of arteriosclerosis.

Dr. Daniel Francis Hochdoefer, St. Louis, aged 66, died January 8 of carcinoma.

Dr. Daniel E. Hammontree, Bolivar, aged 65, died August 12 of nephritis and coronary sclerosis.

Dr. C. Wilbur Smith, Springfield, aged 62 died recently.

Dr. Frank Hinchey, St. Louis, aged 68, died recently.

Dr. Thornton E. Moore, Trenton, aged 56, died December 20 of angina pectoris.

Dr. Stephen A. Stadler, Kansas City, aged 45, died November 1 of hemorrhage in the esophagus.

NORTH CAROLINA

Dr. James B. Bullitt, Professor of Pathology of the Medical School of the University of North Carolina, has been elected President of the local chapter of the American Association of University Professors.

Dr. Aldert S. Root, Raleigh, was recently elected President of the Raleigh Academy of Medicine.

The Tri-State Medical Society elected the following officers for the coming year: Dr. C. C. Orr, Asheville, President; Dr. Frank Smith, Charlotte, Vice-President; Dr. James M. Northington, Charlotte, Secretary.

Dr. C. W. Armstrong, Salisbury, has been reelected County Health Officer.

Dr. J. R. Gamble, Lincolnton, has been reelected Health Officer for Lincoln County.

Dr. H. C. Thompson, Shelby, has been elected Quarantine Officer and County Physician for Cleveland County.

Dr. Badie T. Clark, Rock Mount, and Miss Margaret Page Smith were married January 19.

Dr. L. R. Station, Hendersonville, and Miss Nancy Terrell were married January 12.

Dr. Frank Sabiston, Kinston, and Miss Ethel Anne Roberts were married January 15.

Dr. Robert Stuart Roberson, Hazlewood, and Miss Eunice Simons were married December 27.

Dr. Frederick B. Haar, Greenville, and Miss Nell Venable Hubbard were married January 16.

Dr. Donald Brook Koonce and Miss Louise Bellamy Wood, both of Wilmington, were married January 19.

Continued on page 30

BREAST MILK *from the Normal Mother*

is the

IDEAL FOOD

for the

HUMAN INFANT

That is Why

S. M. A. is Made to Resemble BREAST MILK

in percentages of carbohydrate, protein, fat and total salts (ash) content, and why even the chemical and physical constants of the fat in S.M.A. are like those of breast milk fat.

When breast milk is not available, some modification of cows' milk is the usual choice. If breast milk is ideal, a cows' milk modification should be as close as possible to human breast milk.

We think S.M.A. is an excellent choice for infants deprived of breast milk because of its significant resemblances to breast milk. Even the fat of S.M.A. has the same character numbers and answers the same tests in the same way as does the fat of breast milk. Adaptation of the fats is practically impossible to achieve outside of a laboratory.

S. M. A. was developed at the Babies and Childrens Hospital of Cleveland. It has been ethically offered from the very beginning. Physicians who prescribe it tell us that it produces excellent nutritional results more simply and more quickly.

S.M.A. is a food for infants—derived from tuberculin tested cows' milk, the fat of which is replaced by animal and vegetable fats including biologically tested cod liver oil; with the addition of milk sugar, potassium chloride and salts; altogether forming an antirachitic food. When diluted according to directions, it is *esentially similar to human milk* in percentages of protein, fat, carbohydrates and ash, in chemical constants of the fat and in physical properties. © 1935, S.M.A. Corporation, Cleveland, Ohio

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Made of heavy lined white twill with a soft pad covered with Silkid leather. Recommended for relief of Sacro-Iliac strain or luxation.

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Continued from page 28

Dr. Julian Busby, Kannapolis, and Miss Margaret Little were married December 24.

DEATHS

Dr. Charles Meade Clodfelter, Lexington, aged 56, died January 23 of endocarditis, chronic nephritis and influenza.

Dr. John Thorne Nicholson, Bath, aged 76, died January 31 of angina pectoris.

Dr. Joseph Bedford Smart, Marble, aged 63, died December 22 of bronchopneumonia.

Dr. Ernest Marsh Poate, Southern Pines, aged 50, died February 1 of pneumonia and pulmonary tuberculosis.

Dr. Cassius Harris Morgan, Higgins, aged 68, died December 10.

Dr. Frank E. Deed, Winston-Salem, aged 44, died recently.

Dr. Hubert C. Dixon, Leaksville, aged 43, died February 11 from a heart attack.

Dr. Thel Hooks, Smithfield, aged 58, died February 18 from apoplexy.

Dr. John T. Nicholson, Washington, aged 76, died January 31 from angina pectoris.

Dr. Charles A. Julian, Greensboro, aged 67, died February 16 of pneumonia.

OKLAHOMA

The Cleveland County Medical Society elected the following officers for the coming year: Dr. Charles A. Brake, Norman, President; Dr. R. D. Lowther, Norman, Vice-President; Dr. J. L. Haddock, Norman, Secretary.

The Pontotoc County Medical Society elected the following officers for the coming year: Dr. J. A. Rutledge, Ada, President; Dr. Catherine Brydia, Ada, Vice-President; Dr. W. F. Dean, Ada, Secretary.

The Oklahoma County Medical Society elected the following officers for the coming year: Dr. G. A. Kilpatrick, Henryetta, President; Dr. H. O. Randel, Okmulgee, Vice-President; Dr. M. B. Glismann, Okmulgee, Secretary-Treasurer.

The Comanche County Medical Society elected the following officers for the coming year: Dr. O. L. Parsons, Lawton, President; Dr. H. A. Angus, Lawton, Vice-President; Dr. E. P. Hathaway, Lawton, Secretary-Treasurer.

The Washita County Medical Society elected the following officers for the coming year: Dr. J. F. McMurray, Sentinel, President; Dr. J. P. Jones, Dill, Vice-President; Dr. E. K. Copeland, Cordell, Secretary-Treasurer.

The Comanche County Medical Society was recently entertained by the Medical Officers of the Station Hospital at Fort Sill at the new Officers' Club.

Dr. D. J. Herrington, Cushing, recently spent some time in New Orleans doing postgraduate work at Tulane University.

DEATHS

Dr. Joseph Martin Thompson, Tahlequah, aged 69, died January 2 of pulmonary tuberculosis.

Dr. Tom M. DeArman, Miami, aged 33, died January 28 of complications following pneumonia.

SOUTH CAROLINA

Dr. John M. Brewer and Miss Jean Reynolds Culvera, both of Kershaw, were married January 12.

DEATHS

Dr. John E. McLure, Bishopville, aged 73, died December 28 of acute dilatation of the heart.

Dr. John Willingham DuPree, Greenville, aged 47, died January 19 of coronary thrombosis and essential hypertension.

Dr. Gottlob Augustus Neuffer, Abbeville, aged 73, died January 2 of coronary thrombosis.

Dr. David Lauderdale Bryson, Calhoun Falls, aged 52, died January 5 of cardiovascular renal disease.

TENNESSEE

The Bedford County Medical Society elected the following officers for the coming year: Dr. W. T. Sharpe, Farmington, President; Dr. Alfred Farrar, Shelbyville, Vice-President; Dr. W. H. Avery, Shelbyville, Secretary-Treasurer.

The Blount County Medical Society elected the following officers for the coming year: Dr. C. C. Vinsant, Maryville, Presi-

Continued on page 32

We quote from page 54 of

"The Milk Question"

by M. J. ROSENAU, Professor of Preventive Medicine and Hygiene, Harvard Medical School.

"Man has but a single stomach and this forms about twenty per cent of the digestive tract. The cow has four stomachs which form about seventy percent of the digestive tract. The calf's stomach is well fitted to handle and digest the tough, lumpy curds which form from cow's milk. Woman's milk curdles into a soft mass which is broken into numberless small particles. Evidently the stomach of the infant fed with cow's milk is over-taxed trying to break the tough curds into particles small enough for complete digestion. It is therefore evident that even if we could secure cow's milk, the chemical composition of which was exactly the same as that of human milk, it would still be far from a perfect substitute unless it behaved similarly in the digestive tract."

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Continued from page 30

dent; Dr. L. C. Olin, Maryville, Vice-President; Dr. H. A. Calloway, Maryville, Secretary-Treasurer.

The Campbell County Medical Society elected the following officers for the coming year: Dr. A. L. Lawson, Elk Valley, President; Dr. G. M. Rogers, LaFollette, Vice-President; Dr. F. A. McClintock, Newcomb, Secretary-Treasurer.

The Cocke County Medical Society elected the following officers for the coming year: Dr. J. A. P. Shields, Hartford, President; Dr. J. E. Hampton, Newport, Secretary-Treasurer.

The Fayette and Hardeman Counties Medical Society elected the following officers for the coming year: Dr. John Morris, Somerville, President; Dr. L. D. McAnley, Oakman, Vice-President; Dr. A. Richards, Bolivar, Secretary-Treasurer.

The Gibson County Medical Society elected the following officers for the coming year: Dr. P. D. Jones, Milan, President; Dr. L. H. Montgomery, Trenton, Vice-President; Dr. F. L. Roberts, Trenton, Secretary-Treasurer.

The Hamilton County Medical Society elected the following officers for the coming year: Dr. James L. Bibb, Chattanooga, President; Dr. D. N. Williams, Chattanooga, Vice-President; Dr. W. J. Sheridan, Chattanooga, Secretary-Treasurer.

The Hardin, Lawrence, Lewis, Perry, Wayne Counties Medical Society elected the following officers for the coming year: Dr. G. N. Springer, Hohenwald, President; Dr. C. C. Stockard, Lawrenceburg, Secretary-Treasurer.

The Henry County Medical Society elected the following officers for the coming year: Dr. A. F. Paschall, Puryear, President; Dr. Elroy Scruggs, Paris, Vice-President; Dr. R. Graham Fish, Paris, Secretary-Treasurer.

The Maury County Medical Society elected the following officers for the coming year: Dr. E. M. Ragsdale, Columbia, President; Dr. D. B. Andrews, Columbia, Vice-President; Dr. C. D. Walton, Mt. Pleasant, Secretary-Treasurer.

Dr. William D. Haggard, Nashville, assumed the Presidency of the Southeastern Surgical Congress at the close of its annual convocation in Jacksonville, Florida, in March, having been elected President-Elect one year previously.

Dr. Gunnar Nystrom, Professor of Surgery at the University of Uppsala, Sweden, and Director of the University Hospital, is in residence at the Vanderbilt University School of Medicine as the Abraham Flexner Lecturer for 1935.

Dr. Morris Fishbein, Editor of the *Journal of the American Medical Association*, was a recent visitor to the Vanderbilt University School of Medicine.

Dr. Maurice Brodie, of the Laboratories of the City Health Department of New York City, recently addressed the students of the Medical School at Vanderbilt University.

Dr. William Litterer, Nashville, announces the removal of his office from the Department of Public Health to Litterer Laboraries, Doctors Building, where his practice will be limited to clinical pathology and bacteriology.

Dr. Sam Gilmore Saunders and Miss Katherine Easley, both of Loudon, were married January 17.

Dr. Theodore Morrison Crain, Monterey, and Miss Effie Judd were married December 21.

Deaths

Dr. John M. Kennedy, Knoxville, aged 88, died January 24 of intestinal obstruction.

Dr. William Forest Young, Statesville, aged 72, died January 27 of pneumonia.

Dr. Frank Marberry Acree, Dover, aged 78, died January 29 of senile gangrene with arteriosclerosis.

Dr. David Perkins Oldham, Mount Juliet, aged 73, died January 22 of carcinoma of the liver and gallbladder.

Dr. John A. Ewing, LaVergne, aged 74, died January 21 of heart disease.

Dr. Joseph Steven Dozier, Nashville, aged 62, died January 9 of pneumonia.

TEXAS

The Gregg County Medical Society elected the following officers for the coming year: Dr. J. D. Roberts, Longview, President; Dr. H. H. Neihuss, Gladewater, Vice-President; Dr. Morris Velinsky, Kilgore, Secretary-Treasurer.

The Anderson-Houston Counties Medical Society elected the following officers for the coming year: Dr. J. S. Wootters, Crockett, President; Dr. W. O. Funderburk, Palestine, Vice-President; Dr. Fred E. Felder, Palestine, Secretary.

The Eastland-Callahan Counties Medical Society elected the following officers for the coming year: Dr. T. G. Jackson, Carbon, President; Dr. D. Ball, Cisco, Vice-President; Dr. M. L. Stubblefield, Gorman, Secretary.

Continued on page 34

Constipation in Infancy

It is good practice to endeavor to relieve this condition by adjustments of diet.

It is
Characteristic
of most babies
fed on milk properly modified
with
Mellin's Food
that they are not troubled
with
Constipation

The selection of Mellin's Food as the milk modifier enables the physician to have at hand an effective means of making these diet adjustments and without sacrificing nutritional requirements.

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Continued from page 32

The Caldwell County Medical Society elected the following officers for the coming year: Dr. M. W. Pitts, Luling, President; Dr. Edgar Smith, Lockhart, Vice-President; Dr. Joseph B. Cooperwood, Lockhart, Secretary.

The Wichita County Medical Society elected the following officers for the coming year: Dr. J. D. Hall, Wichita Falls, President; Dr. W. L. Parker, Wichita Falls, Vice-President; Dr. Otto C. Egdorf, Wichita Falls, Secretary.

The Polk-San Jacinto Counties Medical Society elected the following officers for the coming year: Dr. R. B. Love, Livingston, President; Dr. Ivison Grimes, New Willard, Vice-President; Dr. A. L. Delaney, Livingston, Secretary-Treasurer.

The Jasper-Newton Counties Medical Society elected the following officers for the coming year: Dr. W. F. McCreight, Kirbyville, President; Dr. F. T. Blow, Kirbyville, Secretary-Treasurer.

The Palo Pinto County Medical Society elected the following officers for the coming year: Dr. Edward F. Yeager, Mineral Wells, President; Dr. W. S. Pedigo, Strawn, Vice-President; Dr. J. Edward Johnson, Mineral Wells, Secretary-Treasurer.

The Harrison County Medical Society elected the following officers for the coming year: Dr. C. H. Heidelbert, Marshall, President; Dr. L. A. Colquitt, Waskom, Vice-President; Dr. W. H. Bennett, Marshall, Secretary.

The Nolan-Fisher Counties Medical Society elected the following officers for the coming year: Dr. C. A. Rosenbrough, Sweetwater, President; Dr. R. R. Allen, Sweetwater, Vice-President; Dr. John Chapman, Sweetwater, Secretary-Treasurer.

The Gonzales County Medical Society elected the following officers for the coming year: Dr. A. B. Parr, Gonzales, President; Dr. George Holmes, Gonzales, Vice-President; Dr. Louis J. Stahl, Gonzales, Secretary-Treasurer.

The Baylor-Knox-Haskell Counties Medical Society elected the following officers for the coming year: Dr. W. P. Farrington, Munday, President; Dr. T. W. Williams, Haskell, Vice-President; Dr. J. W. Foy, Seymour, Secretary-Treasurer.

The Bell County Medical Society elected the following officers for the coming year: Dr. E. V. Powell, Temple, President; Dr. A. F. Wolfe, Temple, Vice-President; Dr. C. M. Simpson, Temple, Secretary-Treasurer.

The Angelina County Medical Society elected the following officers for the coming year: Dr. O. P. Gandy, Lufkin, President; Dr. C. L. Jackson, Diboll, Vice-President; Dr. L. P. Tenney, Lufkin, Secretary-Treasurer.

The Twelfth District Medical Society elected the following officers for the coming year: Dr. I. E. Colgin, Waco, President; Dr. John E. Lattimore, Waco, Secretary.

Dr. Victor E. Bonelli and Dr. H. O. Deaton, Fort Worth, have been elected members of the Board of Governors of the University Club.

Dr. John H. Barrett, Palestine, has been appointed County Health Officer for Anderson County.

Dr. T. L. Edwards, San Marcos, has been appointed Health Officer for Hays County.

Dr. F. R. Winn, Alvin, has announced plans to erect a two- or three-story office building to be used as a hospital and for physicians' offices.

Dr. H. E. Hipps, formerly of Marlin, has opened offices in Houston.

Dr. M. J. Meynier, Jr., formerly of Kings County Hospital, New York City, has opened offices in the Medical Arts Building, Houston.

Dr. H. G. Bevil, formerly of Silsbee, has moved to Beaumont.

Dr. T. G. Edwards, formerly of Dublin, has moved to Cross Plains.

Dr. W. T. Malone, formerly of San Antonio, has moved to Sanatorium.

Dr. Elbert J. Rice, formerly of Florence, has moved to Georgetown.

Dr. B. J. Roberts, formerly of San Augustine, has moved to Cornelia, Georgia.

Dr. Wilber F. Robertson, formerly of Crystal City, has moved to San Antonio.

Dr. R. B. Wolford, formerly of Vallecitos, New Mexico, has moved to Wichita Falls.

Dr. Dutch K. Robison, formerly of Hereford, has moved to Silver City, New Mexico.

Dr. J. C. Trentham, formerly of Merit, has moved to Celeste.

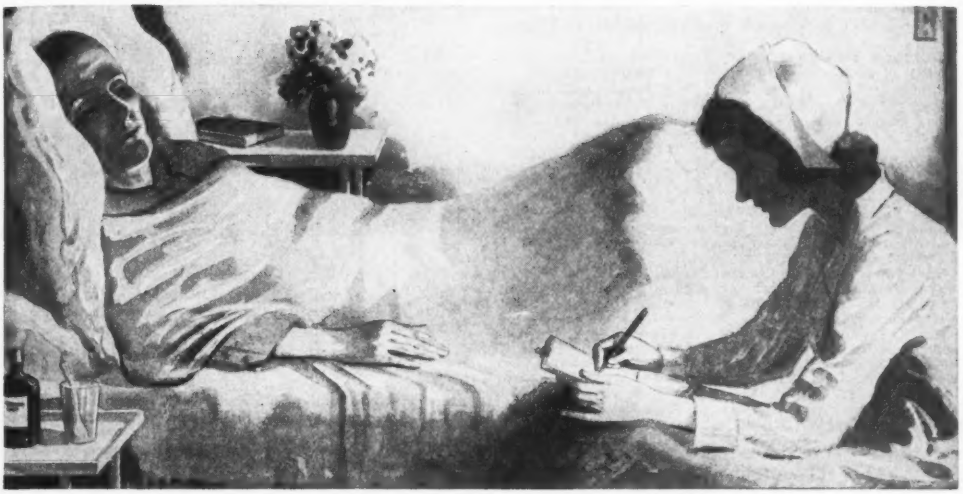
Dr. J. G. Little, formerly of Littlefield, has moved to Andrews.

Dr. Olin Burr Gober, Temple, and Miss Grace McDonough were married December 17.

Dr. William Worthington Samuell and Mrs. Addie Keating Bradford, both of Dallas, were married January 22.

Continued on page 36

Fed Up on cloying beverages?



With Klim, add needed extra food value to almost any *staple dish*

Klim is simply the solids of fresh whole cow's milk in powdered form. All the nutritive value of milk in one-eighth the bulk. If the patient likes mashed potatoes, blend two tablespoons of Klim with a portion. This adds 84 calories with little or no change in appearance, consistency, taste or bulk. And the patient will receive the added benefit of the calcium and other milk minerals in Klim.

At the next meal, try a creamed soup or a cereal fortified with Klim. These and many other tasty recipes for enriched dishes are in the booklet "Reinforced Diet Recipes" which is yours for the asking. The coupon will bring a supply for your convalescent or invalid patients. Fine, too, for children who "won't eat."

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Please send me a supply of "Reinforced Diet Recipes."
(Check here to receive samples of Klim.) ☐

NAME_____ M.D.

ADDRESS_____

CITY_____ STATE_____

Continued from page 34

DEATHS

Dr. Henry A. Blair, San Antonio, aged 76, died November 23 of coronary embolism.

Dr. Dowdell M. Jordan, Oglesby, aged 77, died January 2 of lobar pneumonia.

Dr. Samuel Polk Vineyard, Amarillo, aged 58, died November 28.

Dr. James Davidson Bozeman, Fort Worth, aged 47, died in January of peritonitis as the result of a ruptured appendix.

Dr. Isaac Lycurgus Van Zandt, Fort Worth, aged 95, died January 10 of heart disease, prostatic obstruction and nephritis.

Dr. Eugene Moore Fowler, Dallas, aged 70, died December 27.

VIRGINIA

The Accomac Medical Society elected the following officers for the coming year: Dr. J. Fred Edmonds, Accomac, President; Dr. Alva Mathews, Oak Hall, Vice-President; Dr. John W. Robertson, Onancock, Secretary-Treasurer.

The Arlington County Medical Society elected the following officers for the coming year: Dr. Richard N. Sutton, Clarendon, President; Dr. P. M. Chichester, Clarendon, Vice-President; Dr. Alfred M. Palmer, Clarendon, Secretary-Treasurer.

The Richmond Eye, Ear, Nose and Throat Society elected the following officers for the coming year: Dr. S. M. Cottrell, Richmond, President; Dr. T. B. Weatherly, Richmond, Vice-President; Dr. R. W. Vaughan, Richmond, Secretary-Treasurer.

Dr. Walter L. Bierring, Des Moines, Iowa, President of the American Medical Association, was guest speaker at the Richmond Academy of Medicine recently.

Dr. Fred F. Oast has received an appointment on the Staff of the Veterans' Facility at Roanoke as Medical Officer.

Dr. Francis I. Bloise, formerly of Lorton, has opened offices in Alexandria.

Dr. Leo Jacobs, Norfolk, and Miss Esther Bloom were married February 14.

Dr. Thomas F. Staley and Mrs. Alta Carr Daniel, both of Bristol, were married in January.

Dr. Leon R. Staton, Lynchburg, and Miss Nancy W. Terrell were married January 12.

Dr. Arthur Clayton Smith and Mrs. Virginia Wickham, both of Richmond, were married January 15.

Dr. Thomas Preston McKee, Saltville, and Miss Rose Clifton were married January 12.

Dr. Duncan Roland McEachern and Miss Eloise M. Shepherd, both of Richmond, were married January 23.

DEATHS

Dr. William Tilden Smith, Norfolk, aged 57, died December 28.

Dr. Charles Clifton Tucker, Blackstone, aged 59, died January 28 of arthritis

Dr. George Revis, Sandy Hook, aged 67, died November 29.

Dr. Powhatan Stanley Schneck, Norfolk, aged 72, died January 24.

Dr. Robert Camden Whitehead, Norfolk, aged 59, died January 27 from a heart attack.

Dr. John Gibson Davis, Jr., Christianburg, aged 35, died January 28.

Dr. William Fitzhugh Carter, Crozet, aged 84, died January 1 from pneumonia.

WEST VIRGINIA

The Raleigh County Medical Society elected the following officers for the coming year: Dr. A. G. Bowles, Glen White, President; Dr. B. W. Aiken, Tams, and Dr. F. J. Moore, Affinity, Vice-Presidents; Dr. L. M. Halloran, Beckley, Secretary-Treasurer.

The Cabell County Medical Society had as guest speaker at a recent meeting Dr. Fred W. Rankin, Lexington, Kentucky.

The Monongalia County Medical Society had as guest speaker at a recent meeting Dr. M. B. Ferderber, Pittsburg.

The Ohio County Medical Society had as guest speaker at a recent meeting Dr. Chevalier L. Jackson, Philadelphia.

Dr. Ralph M. Fisher, Weston, and Miss Dorothy Mae Johnson were married recently.

DEATHS

Dr. Thurman Gillespy, Huntington, aged 55, died November 21 of heart disease.

THELESTRIN

OVARIAN FOLLICULAR HORMONE

A standardized preparation of the ovarian follicular hormone for intensive ovarian therapy by hypodermic injection.

Indicated in the treatment of scanty menstrual flow, amenorrhea and the vasomotor and nervous symptoms of the menopause.

Each ampoule contains 25 rat units standardized by the Allen-Doisy method.

Boxes of 6 1-cc. ampoules

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The *new* effective treatment for LEUKORRHEA

• The frequency of leukorrhea due to trichomonas infection is evidenced by numerous publications in recent years. In these cases Devegan fulfills a double purpose. It destroys the trichomonas and the accompanying pathogenic bacteria, and restores the vagina to a healthy condition. Thus a complete cure is accomplished.

This new method of treatment is simple in application, convenient and cleanly. It is easily carried out in the physician's office and at the patient's home.

Devegan Tablets readily disintegrate in the vaginal secretions after their insertion and exert a prompt effect. Their use is unattended with irritation or other discomfort.

Literature and sample on request

Devegan is supplied in boxes of 25 tablets each.

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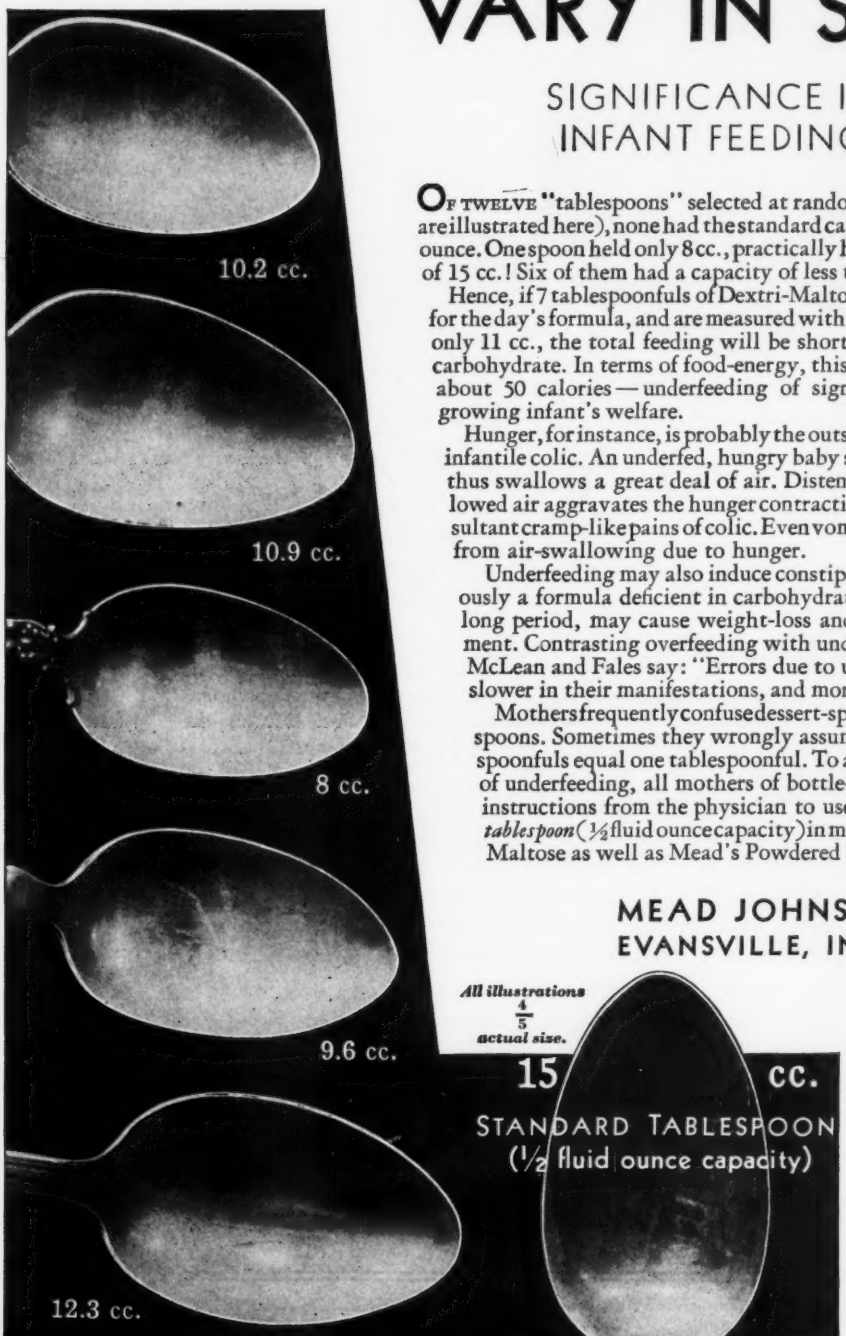
TABLESPOONS VARY IN SIZE

SIGNIFICANCE IN INFANT FEEDING



OF TWELVE "tablespoons" selected at random (six of which are illustrated here), none had the standard capacity of ½ fluid ounce. One spoon held only 8 cc., practically half the standard of 15 cc.! Six of them had a capacity of less than 11 cc.

Hence, if 7 tablespoonfuls of Dextri-Maltose are prescribed for the day's formula, and are measured with a spoon holding only 11 cc., the total feeding will be short almost 25% of carbohydrate. In terms of food-energy, this is a shortage of about 50 calories — underfeeding of significance to the growing infant's welfare.

Hunger, for instance, is probably the outstanding cause of infantile colic. An underfed, hungry baby sucks its fist and thus swallows a great deal of air. Distention from swallowed air aggravates the hunger contractions, with the resultant cramp-like pains of colic. Even vomiting may ensue from air-swallowing due to hunger.

Underfeeding may also induce constipation, and obviously a formula deficient in carbohydrate, given over a long period, may cause weight-loss and slow development. Contrasting overfeeding with undernourishment, McLean and Fales say: "Errors due to underfeeding are slower in their manifestations, and more insidious."

Mothers frequently confuse dessert-spoons with tablespoons. Sometimes they wrongly assume that two teaspoonfuls equal one tablespoonful. To avoid these evils of underfeeding, all mothers of bottle-fed babies need instructions from the physician to use *only a standard tablespoon* (½ fluid ounce capacity) in measuring Dextri-Maltose as well as Mead's Powdered Milks.

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MEAD'S DEPENDABLE INFANT NUTRITION — "WE ARE KEEPING THE FAITH"

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The cereal-starch of PABLUM is more quickly digested than that of long-cooked cereals

FOR many years it has been the custom to cook infants' cereals one, two, and even three hours to increase their digestibility. The microscope (and clinical tests*) now prove that this bothersome and expensive long cooking is unnecessary with Pablum. For, being pre-cooked at 10 pounds steam pressure and dried, it is so well cooked that it can be served simply by adding water or milk of any temperature. Photomicrographs and also digestibility studies *in vitro* give evidence of this thorough cooking.

Fifteen cereals (both cooked and uncooked) studied microscopically were revealed as containing many starch granules, most of them massed into dense clumps. *Such unruptured clumps were never observed in hundreds of examinations of Pablum.* The latter consists, rather, of porous flakes which, like sponges, drink up liquids. Hence Pablum can be entirely saturated by the digestive secretions. This is borne out by studies of Ross and Burrill who found that the starch of Pablum is more rapidly digested than that of ordinary cereals cooked 4 hours.

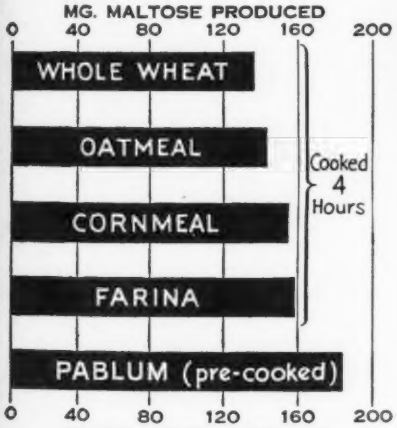
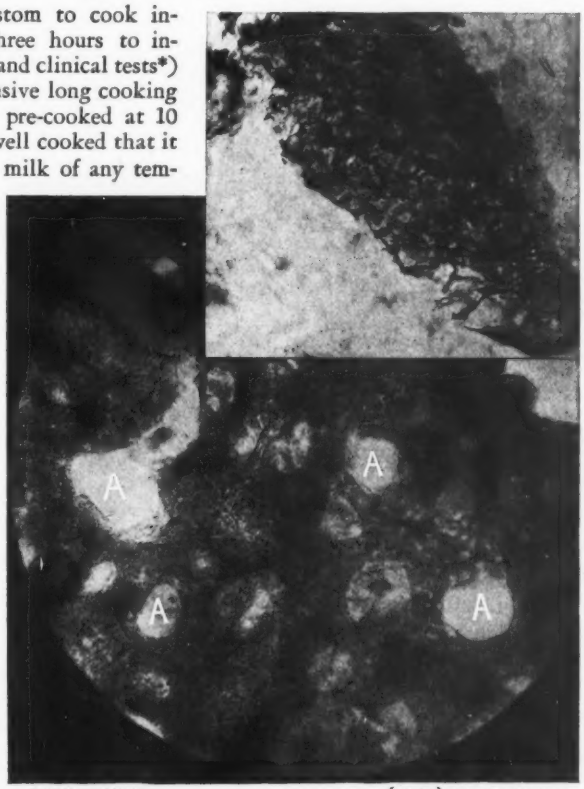


*Chart shows that maltose production is much greater for Pablum prepared with cold water than for other cereals cooked 4 hours. Ross and Burrill (Journal of Pediatrics, May 1934) conclude from this and from the total soluble carbohydrate formed that starch digestion of Pablum is more rapid than that of 6 other cereals.



140 X. STAINED (INSET) 290 X. STAINED

Large photomicrograph: Pablum mixed with cold water—portion of large flake. Pablum flakes are honeycombed with "pores" or air-spaces (note light areas A). This porosity permits ready absorption of digestive fluids by the entire flake. No starch granules are visible—they have been completely ruptured.

Inset: Farina cooked ½ hour—clump of cereal composed of unruptured starch granules. Note density of clump and lack of porosity. Many starch granules, such as are present in raw cereal, remain unchanged in form.

BESIDES being thoroughly cooked and readily digestible, Pablum supplies essential vitamins and minerals, especially vitamins A, B, E, and G, and calcium, phosphorus, iron, and copper. It is a palatable cereal consisting of wheatmeal, oatmeal, cornmeal, wheat embryo, alfalfa leaf, beef bone, brewers' yeast, and salt.

*Reprint of Ross and Burrill paper sent on request of physicians.

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Prophylaxis and Treatment of Allergic Shock
Inject intramuscularly. Prophylaxis, 0.3 to 0.5 cc. Treatment, 0.5 to 1 cc.; repeat as necessary.

Serum Sickness, Urticaria
0.3 to 0.5 cc. intramuscularly; repeat every two or three hours if necessary.

Asthmatic Paroxysms
0.3 to 0.5 cc. intramuscularly, repeat as necessary.

Shock and Collapse
0.5 to 1.0 cc. intramuscularly. For quicker action—give 0.1 to 0.2 cc. in 10 to 20 cc. of physiologic salt solution intravenously.

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as from asphyxia or drowning or in the newborn, severe electric shock, etc.
0.3 to 0.5 cc. injected directly into the heart.

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